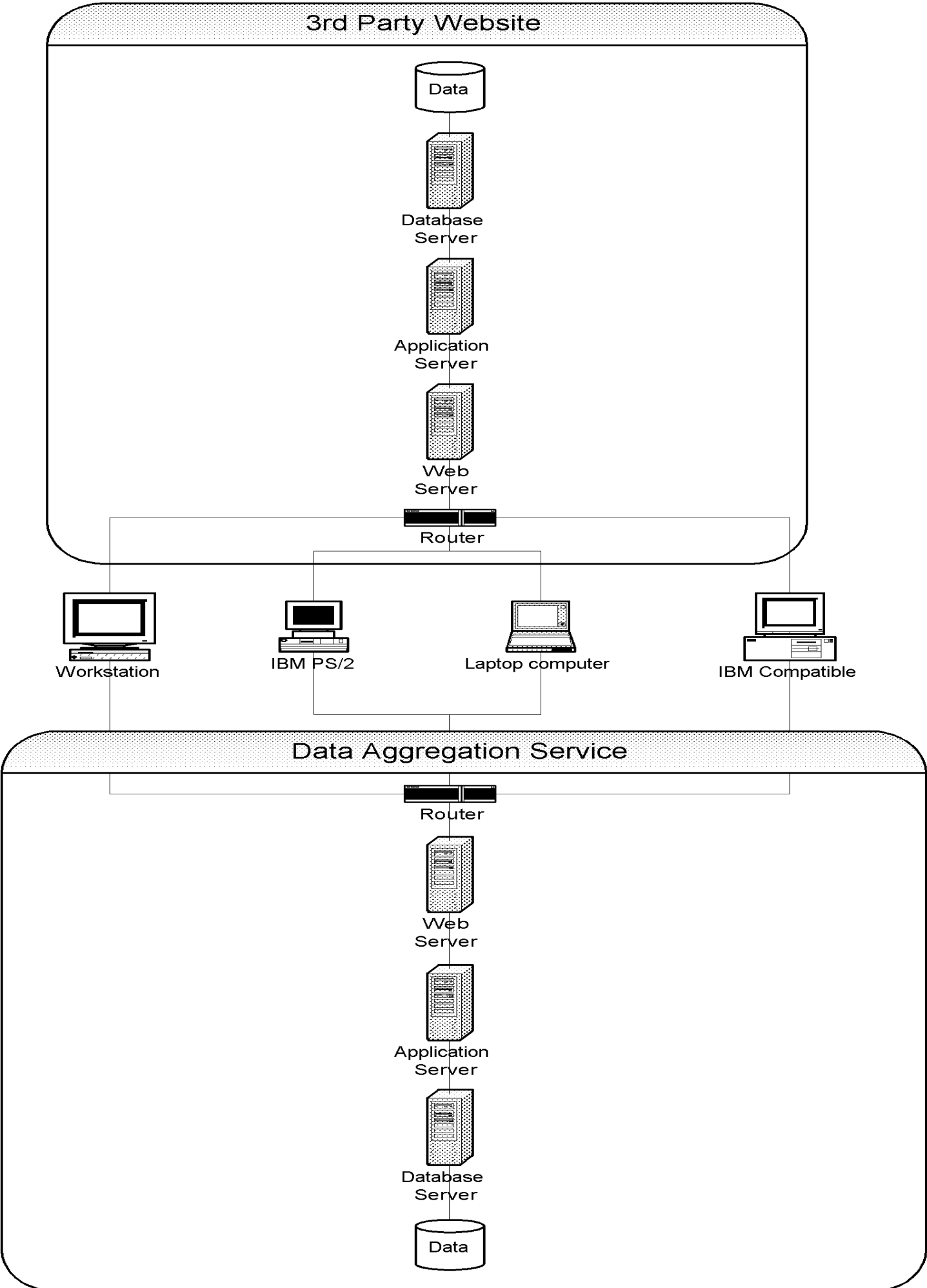# Figure 1: Data Aggregation Network Architecture

Figure 2: Data Aggregation With Client Pull and Server-Side Profile
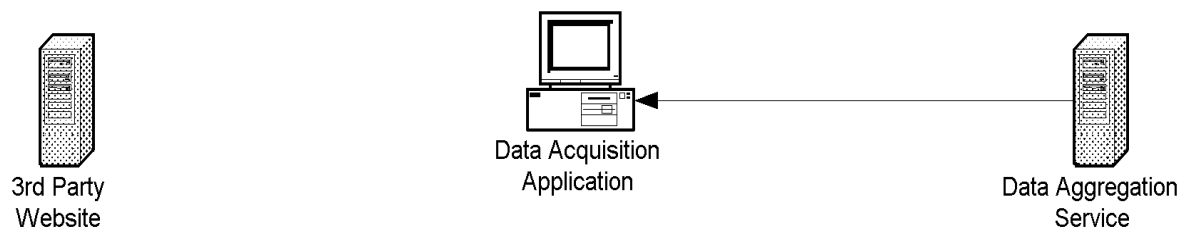
Step 1: Data Aggregation Service generates a request
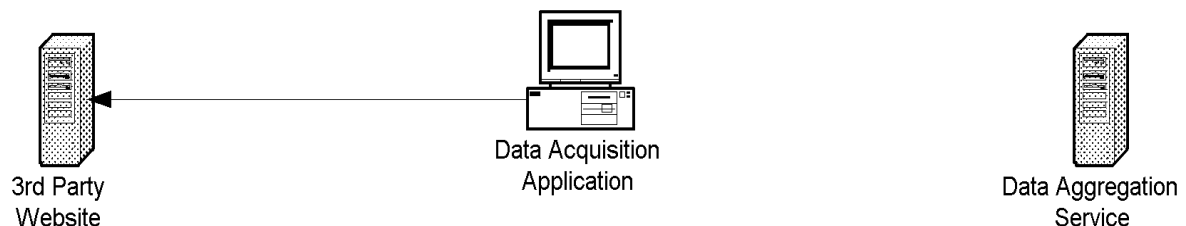for the Data Acquisition Application to acquire

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 2: Data Acquisition Application polls the Data
Aggregation Service for a request

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service
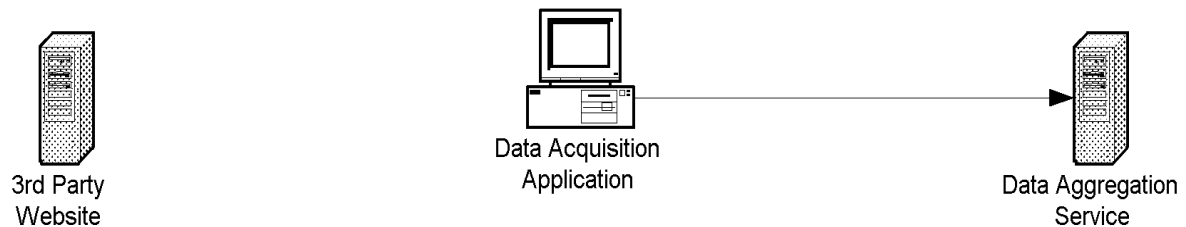
Step 3: Data Acquisition Application downloads a request from the
Data Aggregation Service, perhaps after a delay in placing the request
in the request queue to simulate a human user so as to hide the
automated nature of the data request

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 4: Data Acquisition Application sends request to 3rd Party
Website, perhaps after a delay to simulate a human user so as
to hide the automated nature of the data request and perhaps
after logging into the 3rd party website

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 5: 3rd Party Website sends response to Data
Acquisition Application

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 6 (S2P2S2P2S only): Data Acquisition Application returns
response to Data Aggregation Service. This step occurs in the
S2P2S2P2S case, but not in the S2P2S2P case.

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 7: Process repeats

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Figure 3: Data Aggregation With Server Push and Server-Side Profile

Step 1: Data Aggregation Service generates a request
for the Data Acquisition Application to acquire

3rd Party
Website
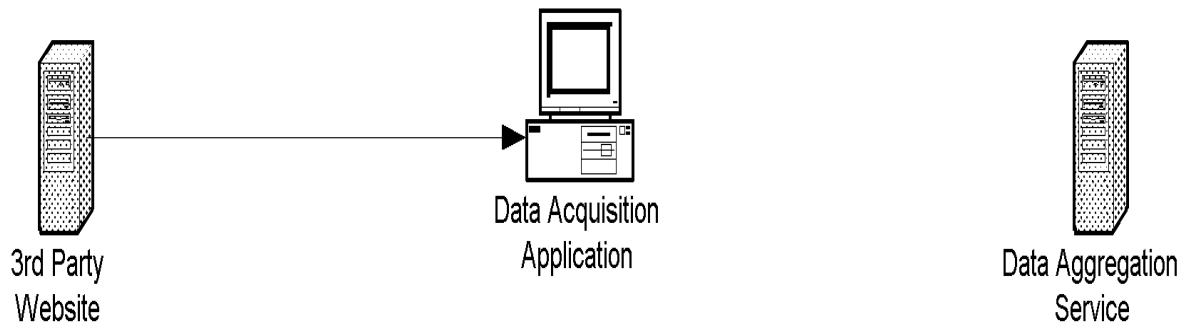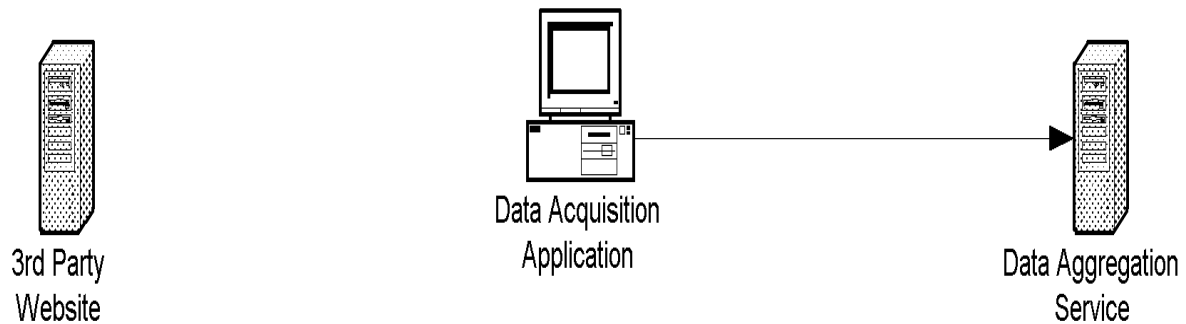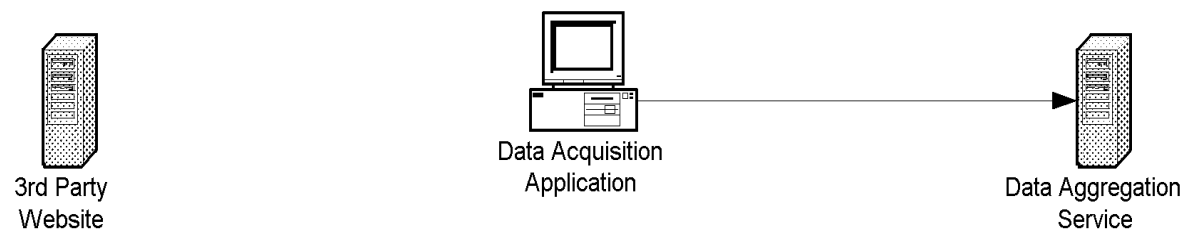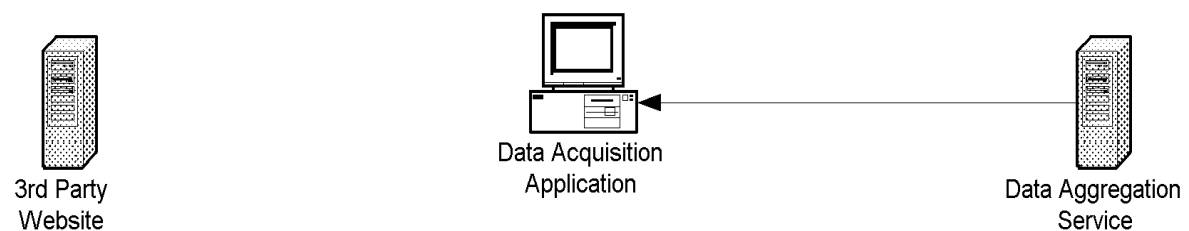
Data Acquisition
Application

Data Aggregation
Service

Step 2: Data Acquisition Application opens a socket
connection to the Data Aggregation Service

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 3: Data Aggregation Service pushes a request to the Data
Acquisition Application, perhaps after a delay to simulate a human
user so as to hide the automated nature of the data request

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 4: Data Acquisition Application sends request to 3rd
Party Website, perhaps after a delay to simulate a human
user so as to hide the automated nature of the data request
and perhaps after logging in to the 3rd party website

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 5: 3rd Party Website sends response to Data
Acquisition Application

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 6 (S2P2S2P2S only): Data Acquisition Application returns
response to Data Aggregation Service. This step occurs in the
S2P2S2P2S case, but not in the S2P2S2P case.

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 7: Process repeats

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Figure 4: Data Aggregation With Client Pull and Client-Side Profile

Step 1: Data Aggregation Service generates a non-specific
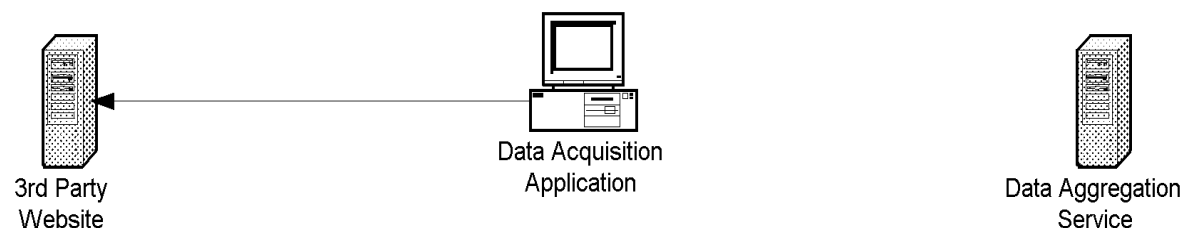request for the Data Acquisition Application to acquire

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 2: Data Acquisition Application polls the Data
Aggregation Service for a request

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 3: Data Acquisition Application downloads non-specific request
from the Data Aggregation Service, perhaps after a delay in placing the
request in the request queue to simulate a human user so as to hide
the automated nature of the data request

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 4: Data Acquisition Application combines non-specific request with preference profile
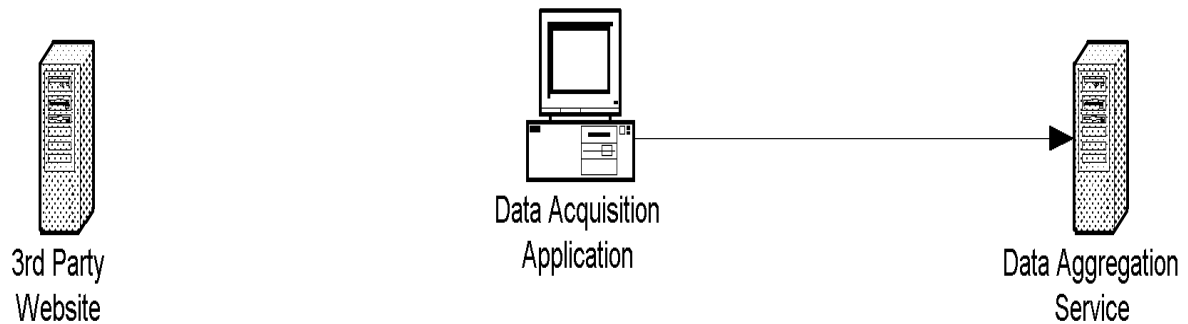information to form specific request that it then issues to a 3rd Party Website, perhaps after a
delay to simulate a human user so as to hide the automated nature of the data request and
perhaps after logging into the 3rd party website

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 5: 3rd Party Website sends response to Data
Acquisition Application

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 6 (S2P2S2P2S only): Data Acquisition Application returns
response to Data Aggregation Service. This step occurs in the
S2P2S2P2S case, but not in the S2P2S2P case.

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 7: Process repeats

3rd Party
Website

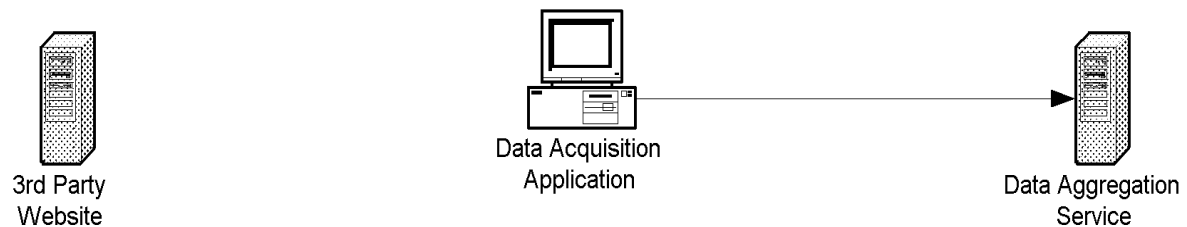Data Acquisition
Application

Data Aggregation
Service

Figure 5: Data Aggregation With Server Push and Client-Side Profile
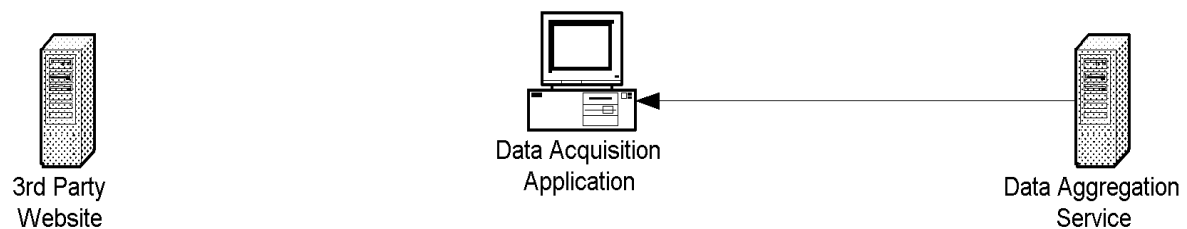
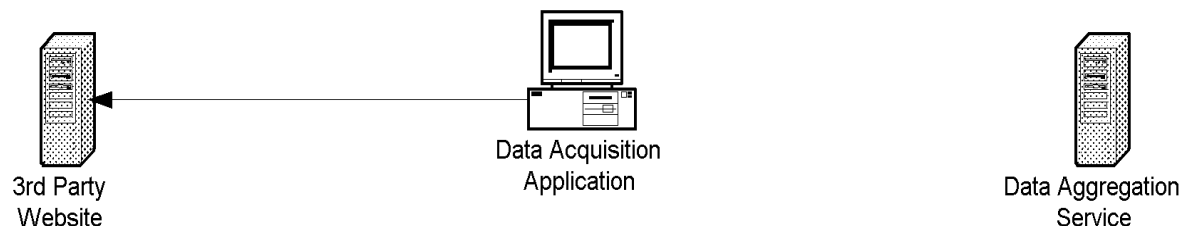Step 1: Data Aggregation Service generates a non-specific request for the Data Acquisition Application to acquire

3rd Party Website
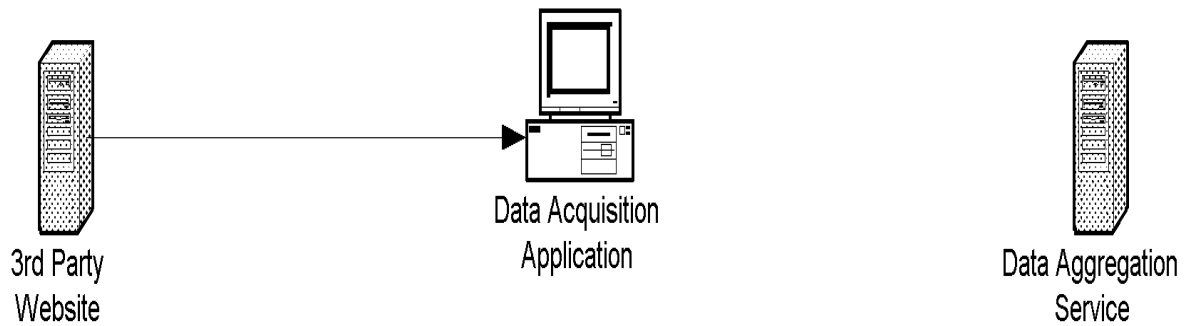
Data Acquisition Application

Data Aggregation Service

Step 2: Data Acquisition Application opens a socket connection to the Data Aggregation Service

3rd Party Website

Data Acquisition Application

Data Aggregation Service
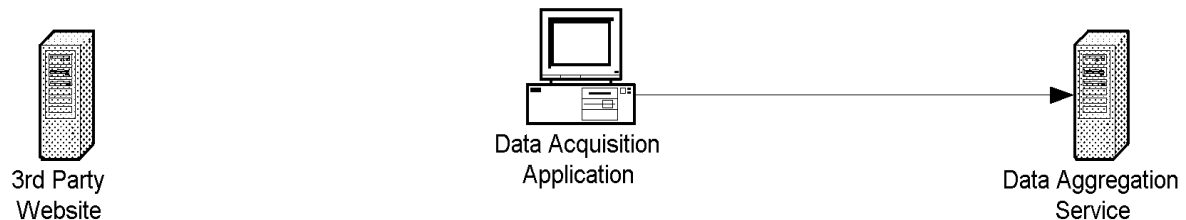
Step 3: Data Aggregation Service pushes a non-specific request to the Data Acquisition Application, perhaps after a delay to simulate a human user so as to hide the automated nature of the data request

3rd Party Website
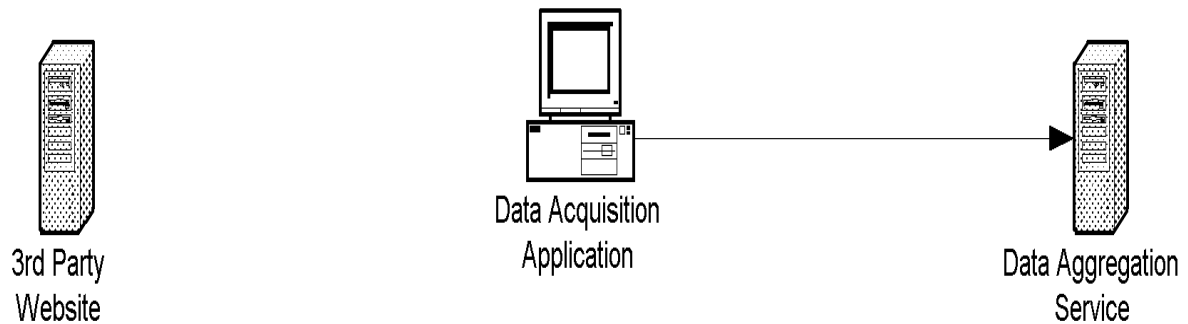
Data Acquisition Application

Data Aggregation Service

Step 4: Data Acquisition Application combines non-specific request with preference profile information to form specific request that it then issues to a 3rd Party Website, perhaps after a delay to simulate a human user so as to hide the automated nature of the data request and perhaps after logging into the 3rd party website

3rd Party Website

Data Acquisition Application

Data Aggregation Service

Step 5: 3rd Party Website sends response to Data
Acquisition Application

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 6 (S2P2S2P2S only): Data Acquisition Application returns
response to Data Aggregation Service. This step occurs in the
S2P2S2P2S case, but not in the S2P2S2P case.

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Step 7: Process repeats

3rd Party
Website

Data Acquisition
Application

Data Aggregation
Service

Figure 6a: Server-Side Data Aggregation

Step 1: Data Aggregation Application generates Client-Specific Request
based on Data Collected From Client Applications, End User Profiles,
Knowledge of 3rd Party Websites, and Other Data

Data Aggregation Service (Application & Database)

Database

Data Collected From Client Applications

Data collected from End User A

Data collected from End User B

Data collected from End User C

End User Profiles

End User A Profile

End User B Profile

End User C Profile

Other Data

Other data of interest to end users

Knowledge of 3rd Party Websites

Knowledge of how to form requests to generate desired responses from 3rd party websites

Client-Specific Request Queue

Data Aggregation Application

Client-Specific Request Generator

Client Response

Client Machine

Data Acquisition Application

Process to receive requests from and receive-and-send responses

Figure 6b: Server-Side Data Aggregation

Step 2: After request has been generated, it is stored in the Client-Specific Request
Queue associated with the client's end user's profile for pickup by or delivery to the client

Data Aggregation Service (Application & Database)

Database

Data Collected From Client Applications

Data collected from End User A

Data collected from End User B

Data collected from End User C

End User Profiles

End User A Profile

End User B Profile

End User C Profile

Other Data

Other data of interest to end users

Knowledge of 3rd Party Websites

Knowledge of how to form requests to generate desired responses from 3rd party websites

Client-Specific Request Queue

Data Aggregation Application

Client-Specific Request Generator

Client Response

Client Machine

Data Acquisition Application

Process to receive requests from and receive-and-send responses

Figure 6c: Server-Side Data Aggregation

Step 3: Data Acquisition Application downloads request(s) from its Client-Specific Request Queue (or request is pushed to the Data Acquisition Application over an open socket connection) and the Data Acquisition Application then issues request(s) to 3rd Party Website(s)

Data Aggregation Service (Application & Database)

Database

Data Collected From Client Applications

Data collected from End User A

Data collected from End User B

Data collected from End User C

End User Profiles

End User A Profile

End User B Profile

End User C Profile

Other Data

Other data of interest to end users

Knowledge of 3rd Party Websites

Knowledge of how to form requests to generate desired responses from 3rd party websites

Client-Specific Request Queue

Data Aggregation Application

Client-Specific Request Generator

Client Response

Client Machine

Data Acquisition Application

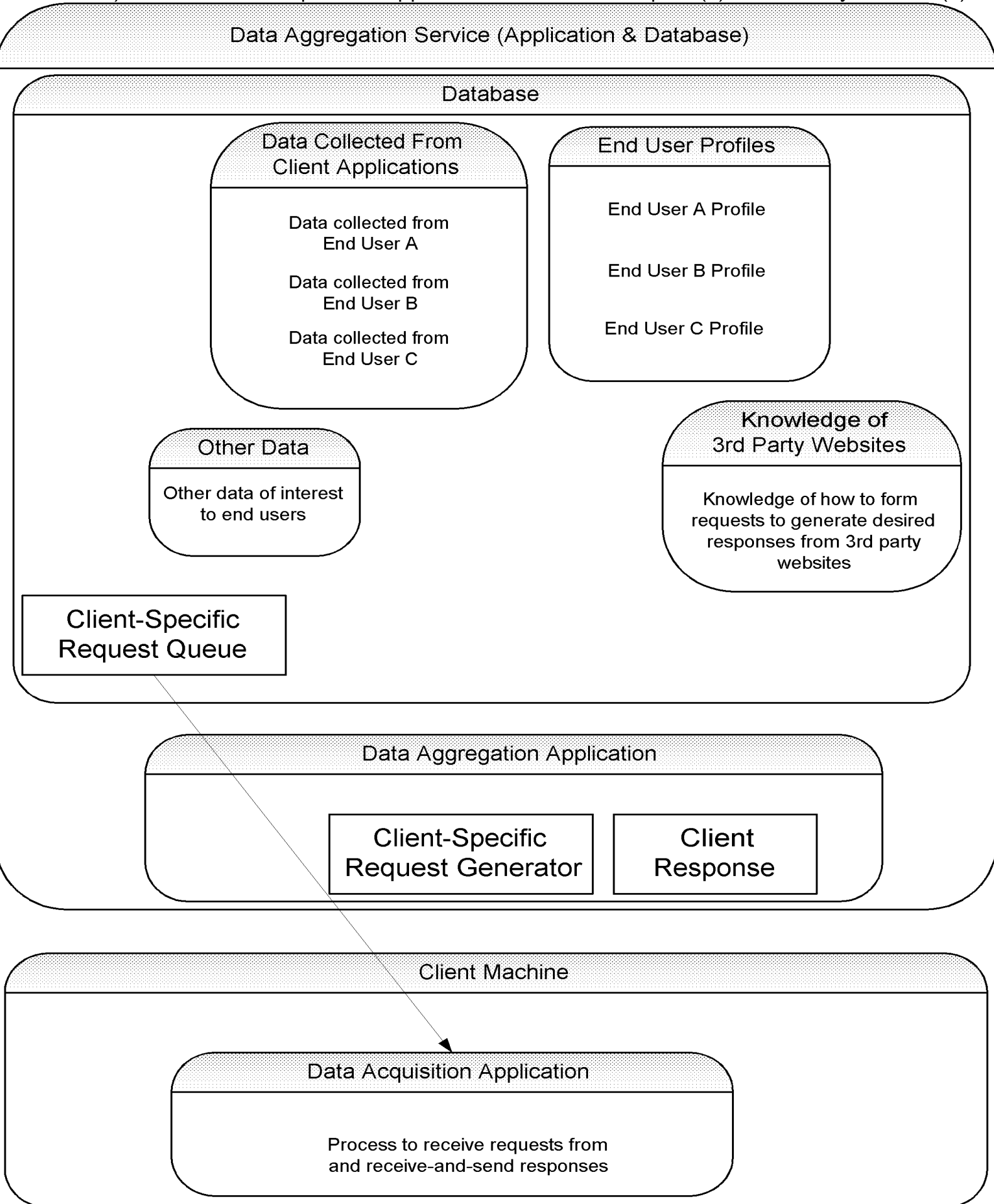Process to receive requests from and receive-and-send responses

Figure 6d: Server-Side Data Aggregation
Step 4: Data Acquisition Application receives response(s) to request(s) sent to 3rd Party Website(s) and returns those responses (perhaps after modifying and/or processing them) to the Data Aggregation Application

Data Aggregation Service (Application & Database)

Database

Data Collected From Client Applications

Data collected from End User A

Data collected from End User B

Data collected from End User C

End User Profiles

End User A Profile

End User B Profile

End User C Profile

Other Data

Other data of interest to end users

Knowledge of 3rd Party Websites

Knowledge of how to form requests to generate desired responses from 3rd party websites

Client-Specific Request Queue

Data Aggregation Application

Client-Specific Request Generator

Client Response

Client Machine

Data Acquisition Application

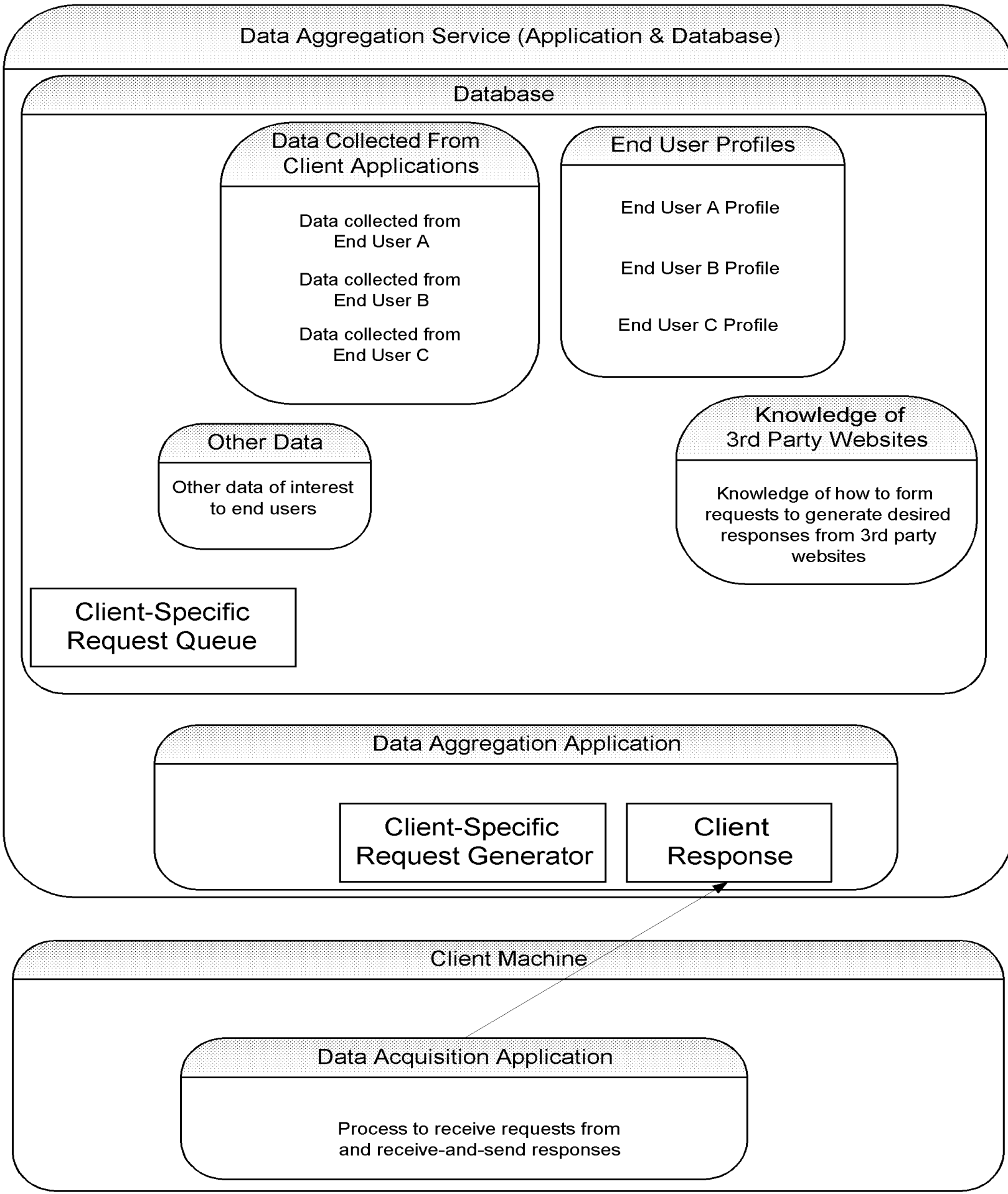Process to receive requests from and receive-and-send responses

Figure 6e: Server-Side Data Aggregation

Step 5: Data Aggregation Application stores data received from the Data Acquisition
Application (perhaps after modifying and/or transforming it) in the database
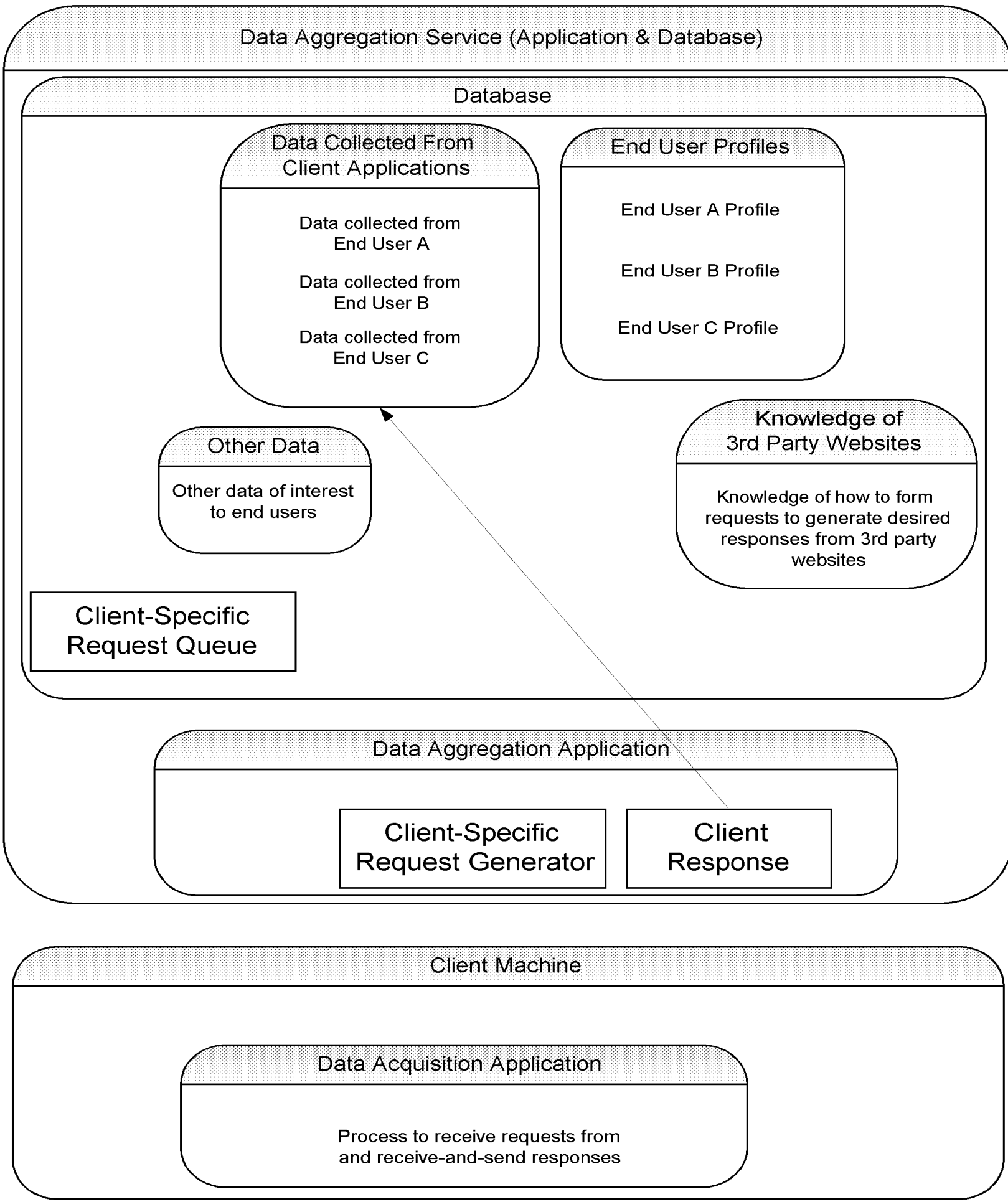
Data Aggregation Service (Application & Database)

Database

Data Collected From Client Applications

Data collected from
End User A

Data collected from
End User B

Data collected from
End User C

End User Profiles

End User A Profile

End User B Profile

End User C Profile

Other Data

Other data of interest
to end users

Knowledge of 3rd Party Websites

Knowledge of how to form
requests to generate desired
responses from 3rd party
websites

**Client-Specific
Request Queue**

Data Aggregation Application

**Client-Specific
Request Generator**

**Client
Response**

Client Machine

Data Acquisition Application

Process to receive requests from
and receive-and-send responses

Figure 6f: Server-Side Data Aggregation
Step 6: Repeat Steps 1 - 5 as many times as necessary to acquire all desired data

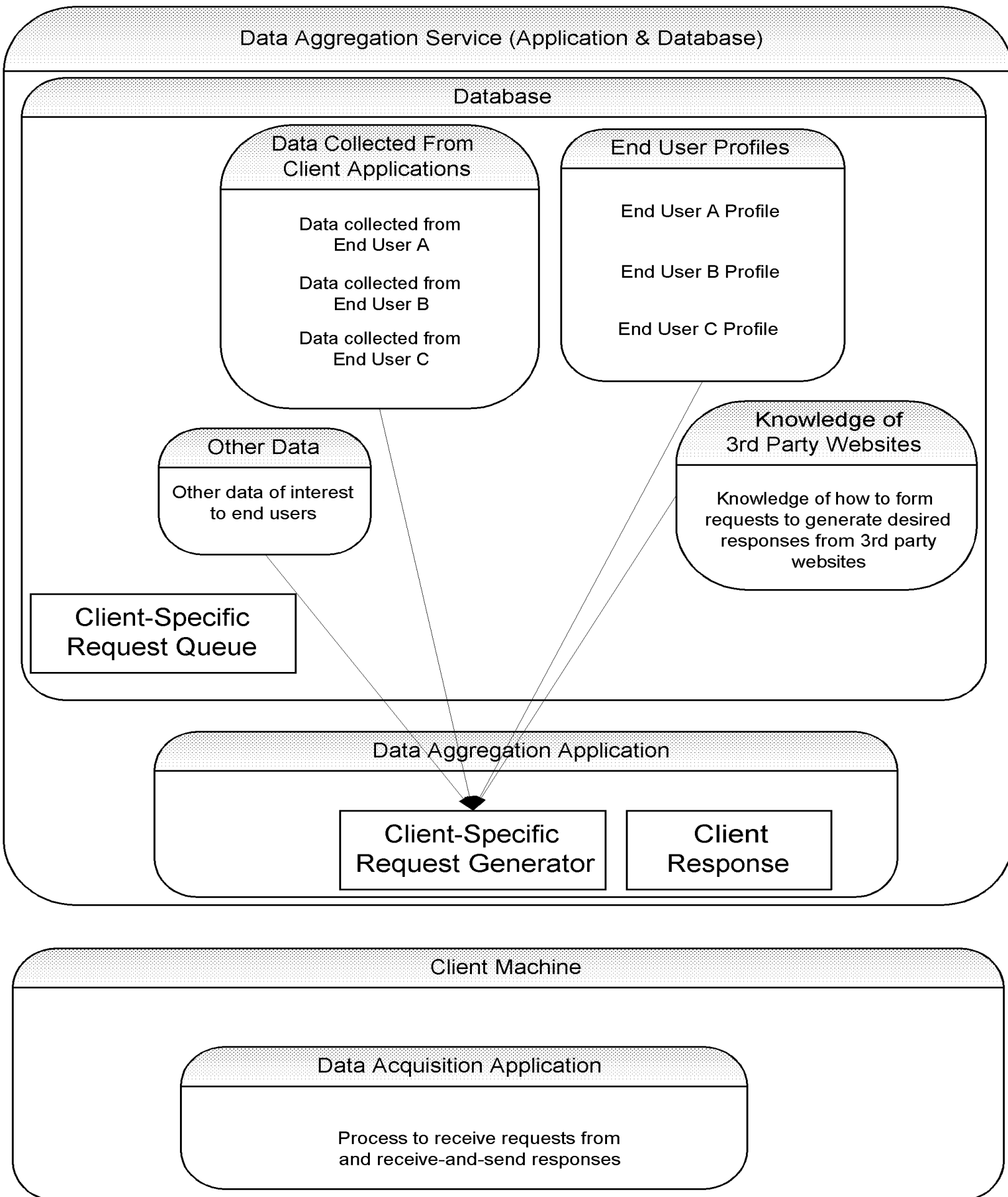## Data Aggregation Service (Application & Database)

Database

Data Collected From Client Applications

Data collected from End User A

Data collected from End User B

Data collected from End User C

End User Profiles

End User A Profile

End User B Profile

End User C Profile

Other Data

Other data of interest to end users

Knowledge of 3rd Party Websites

Knowledge of how to form requests to generate desired responses from 3rd party websites

Client-Specific Request Queue

Data Aggregation Application

Client-Specific Request Generator

Client Response

Client Machine

Data Acquisition Application

Process to receive requests from and receive-and-send responses

Figure 7a: Overall Process - Architecture

The overall architecture consists of one or more 3rd Party Websites, one or more Client Machines (each with a Data Acquisition Application and/or Client Interaction Application) and a Data Aggregation Service (with a Data Aggregation Application, End User Interaction Application, and Database)
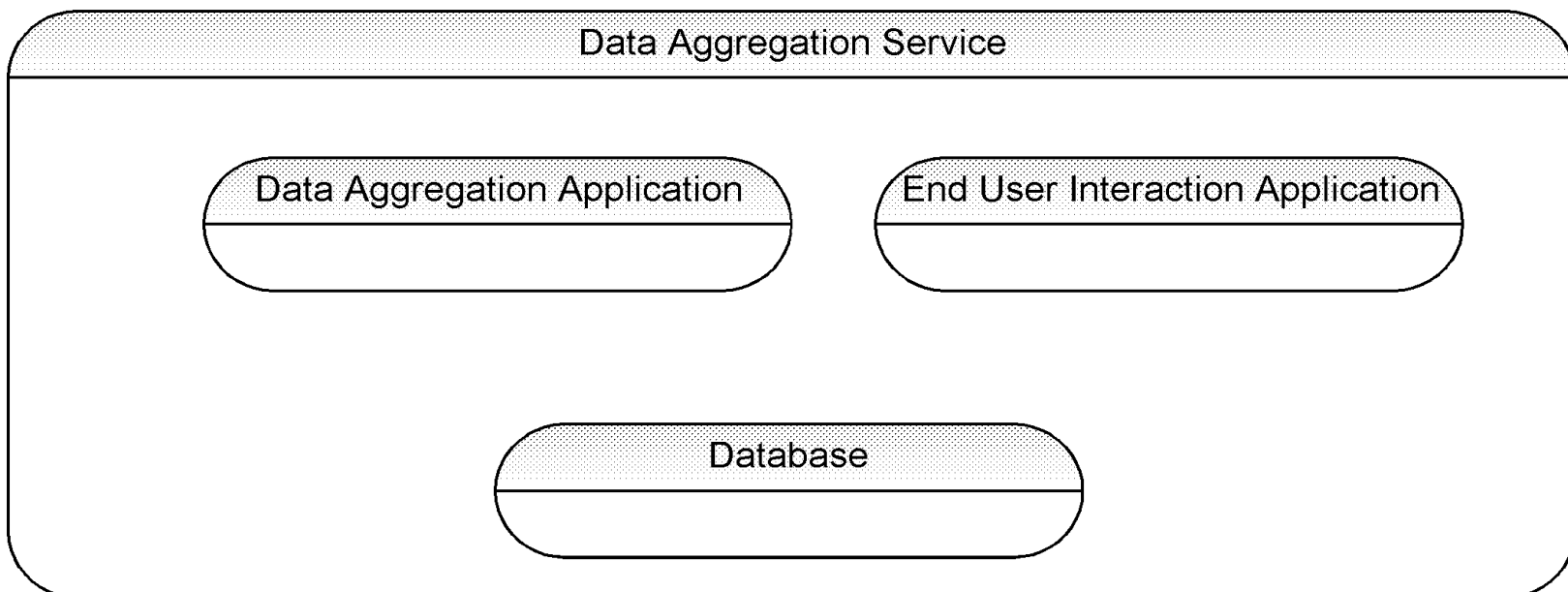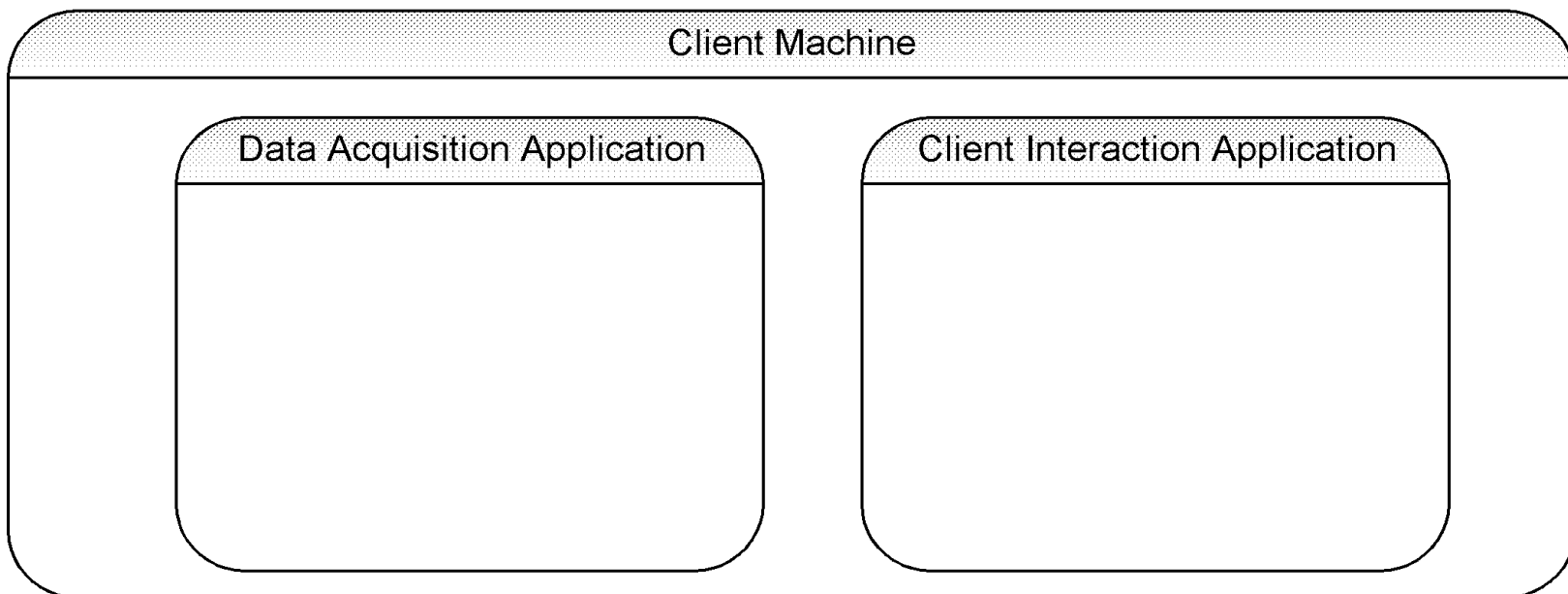
3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

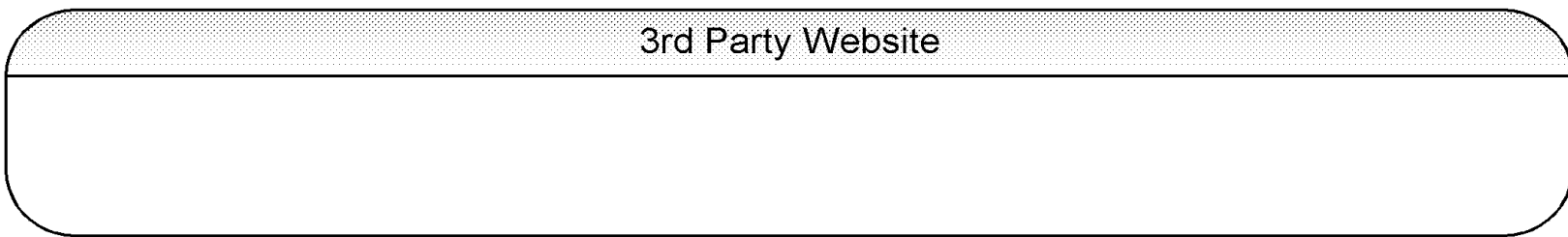End User Interaction Application

Database

Figure 7b: Overall Process - Step 1

End user creates or updates personal profile by
accessing end user interaction application via
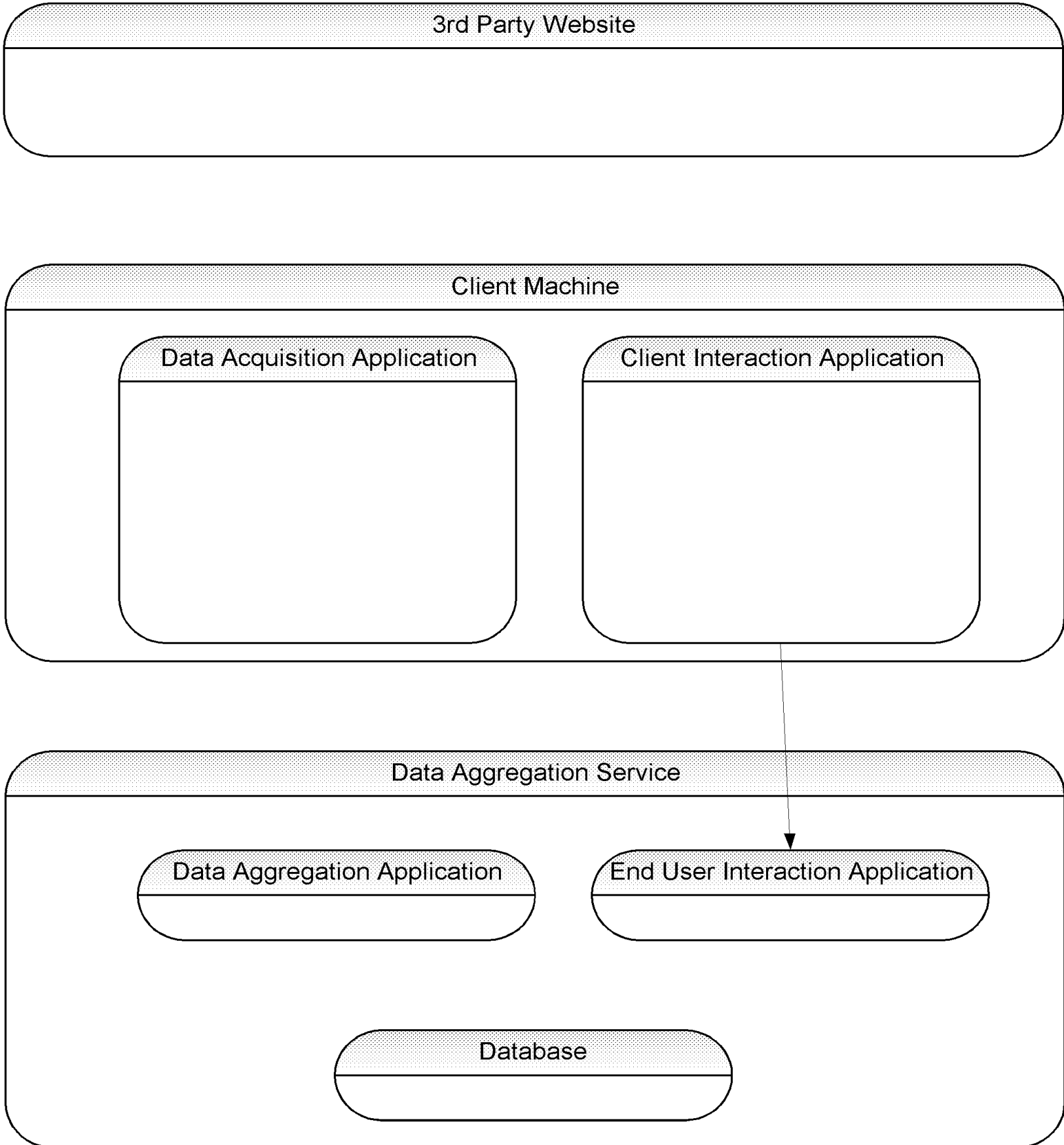client interaction application

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

End User Interaction Application

Database

Figure 7c: Overall Process - Step 2

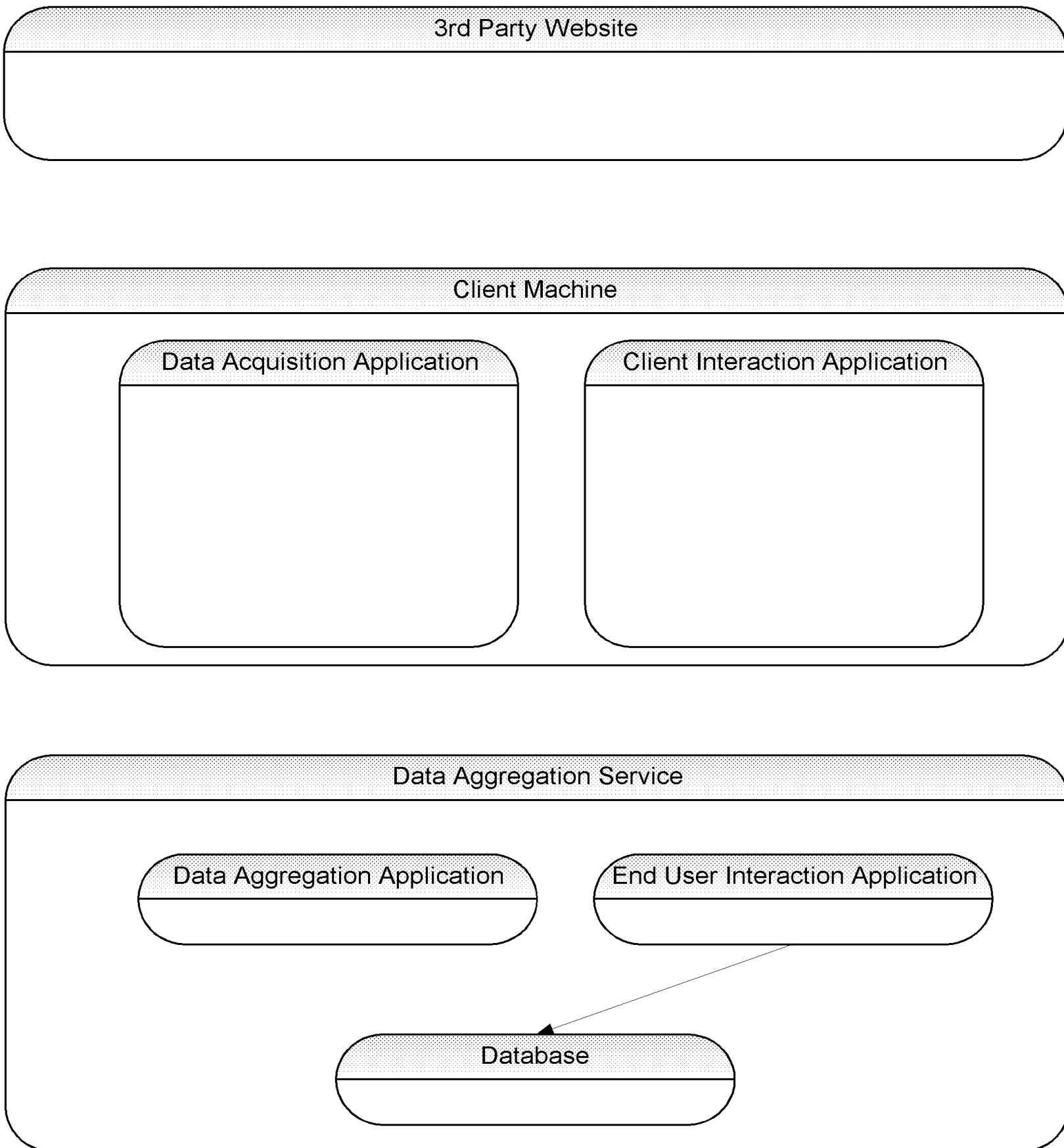### End User Interaction Application stores end user's profile in Data Aggregation Service database

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

End User Interaction Application

Database

Figure 7d: Overall Process - Step 3

Data Aggregation Application accesses end
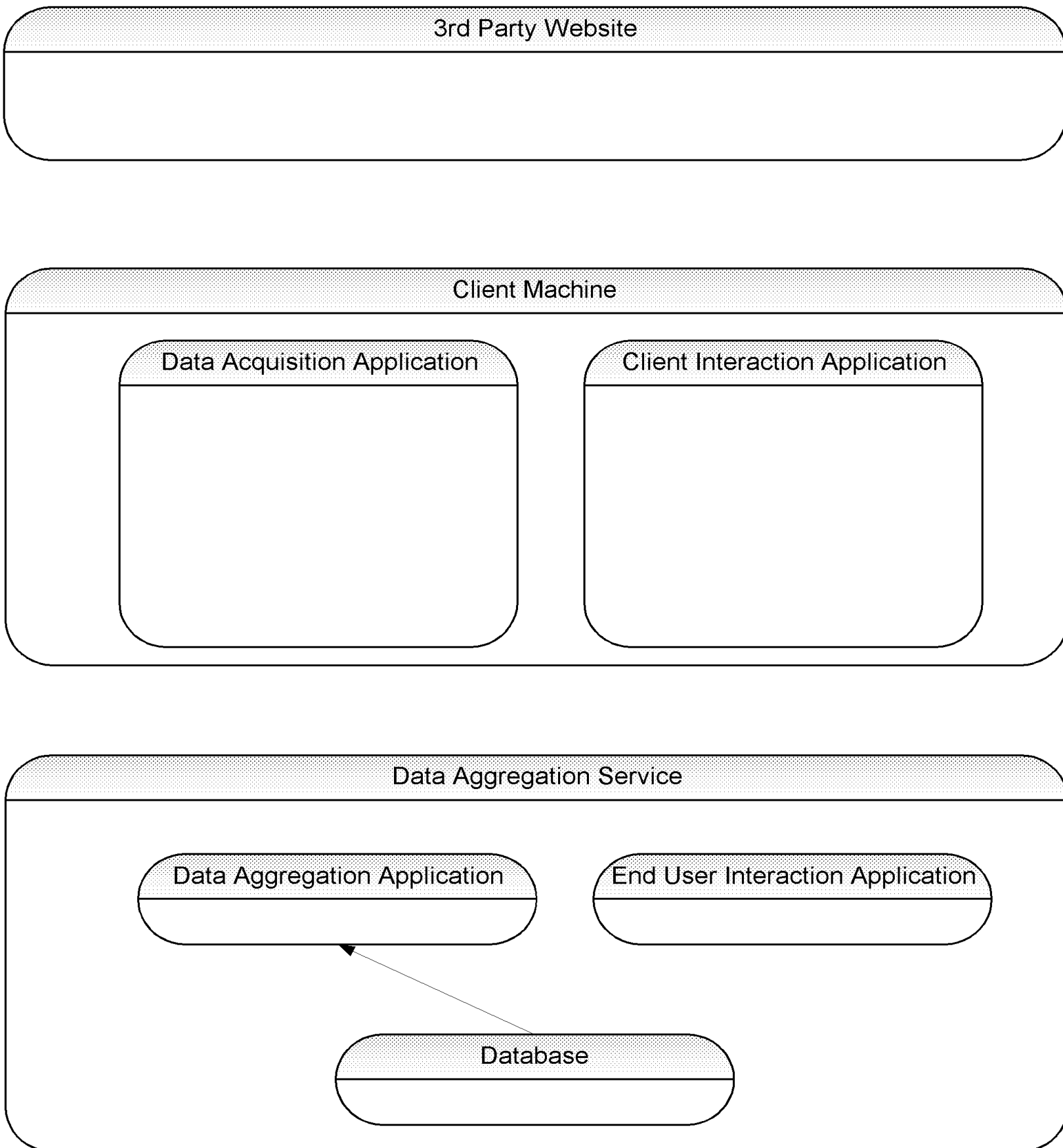user's profile from Data Aggregation Service
database

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

End User Interaction Application

Database

Figure 7e: Overall Process - Step 4

Data Aggregation Application uses end user's profile to generate one or
more requests and store them on the end user's client-specific request
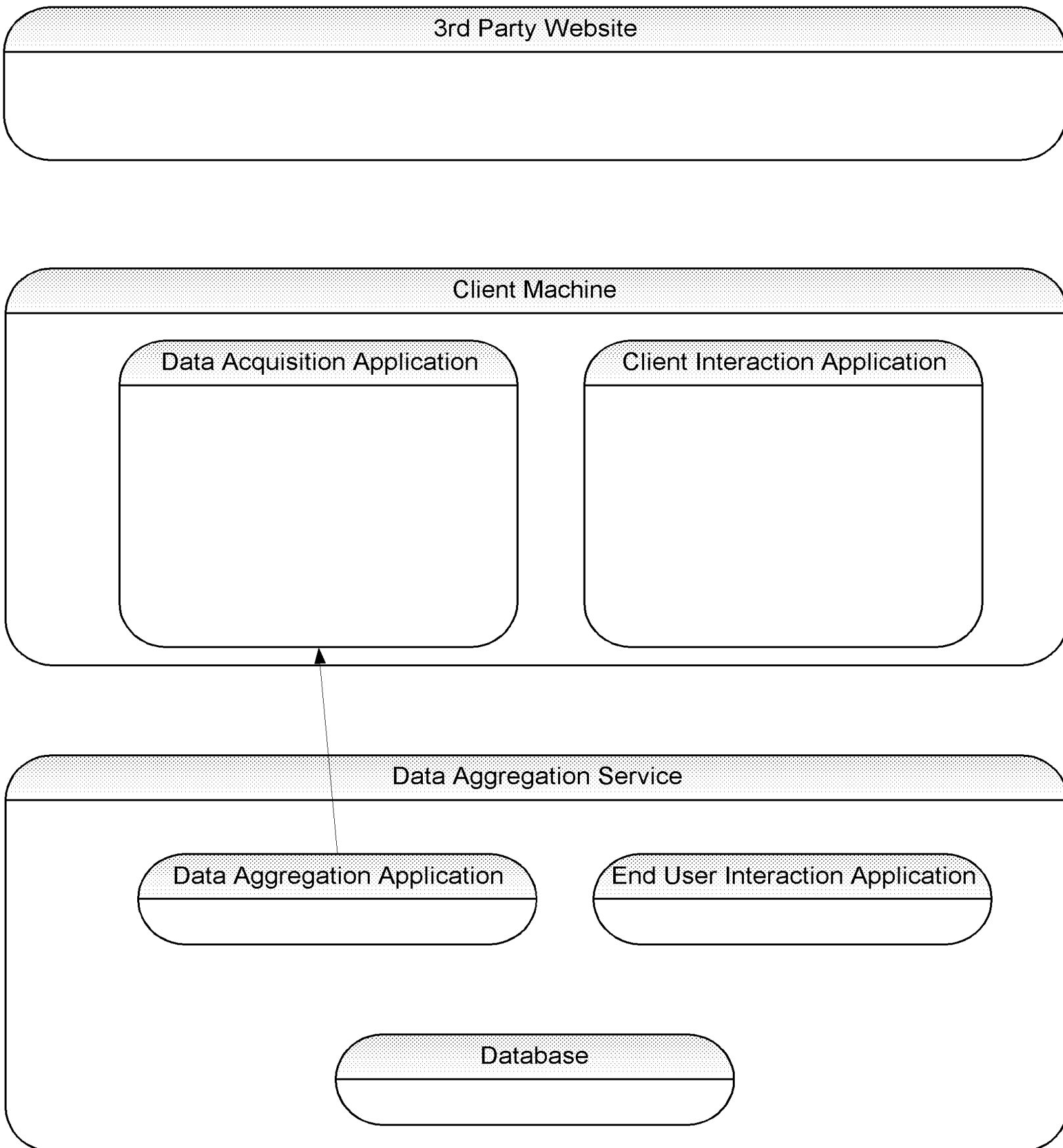queue where it is picked up by the end user's Data Acquisition Application

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

End User Interaction Application

Database

Figure 7f: Overall Process - Step 5

Data Acquisition Application issues request(s)
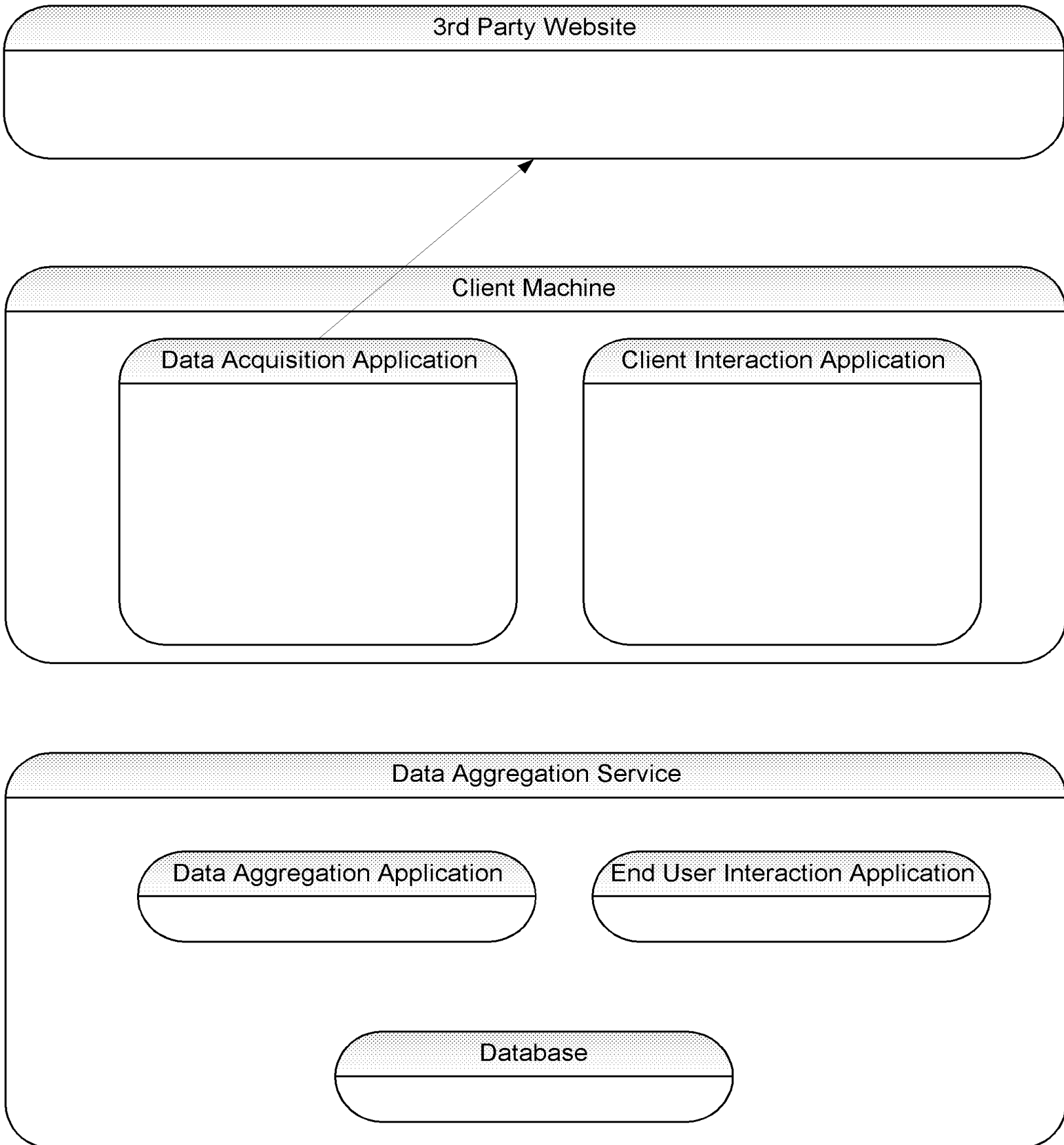to 3rd Party Website(s).

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

End User Interaction Application

Database

Figure 7g: Overall Process - Step 6

3rd Party Website replies to Data Acquisition
Application request with a response

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application
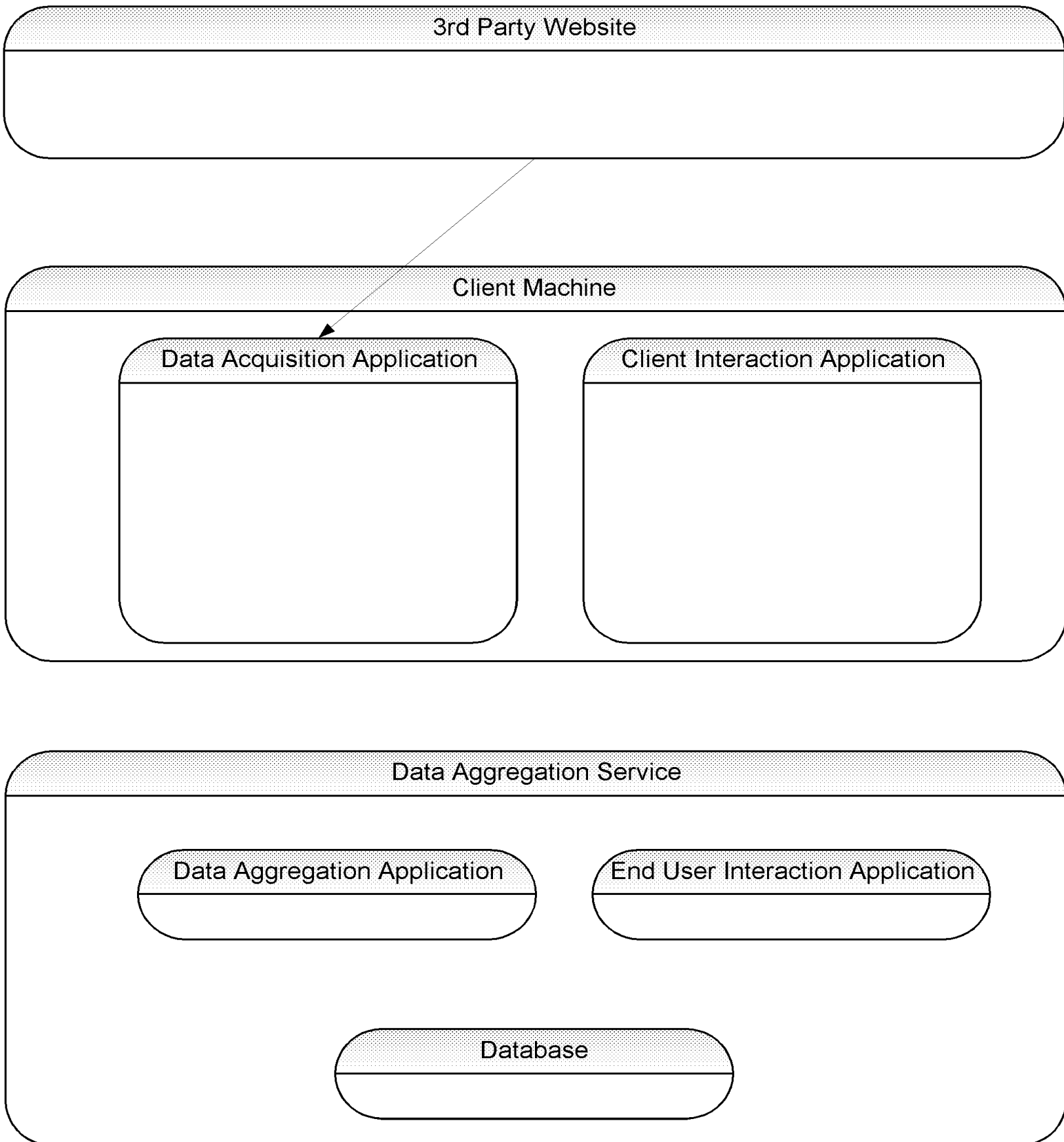
End User Interaction Application

Database

Figure 7g*: Overall Process - (optional) Step 6 1/2

3rd Party Website reply to Data Acquisition
Application request triggers additional request(s).
Repeat Step 6 1/2 as many times as necessary to
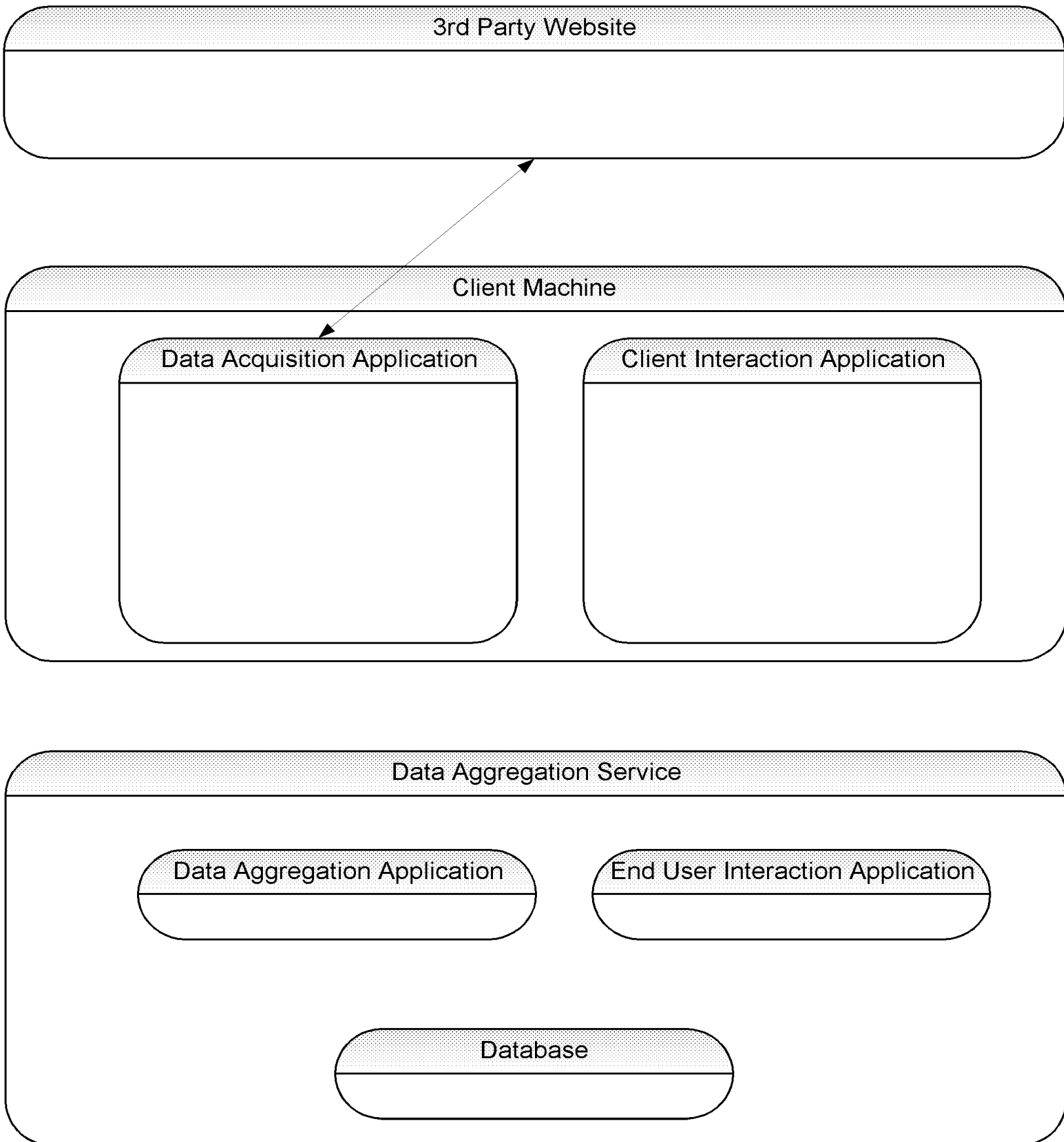acquire all desired data persuant to initial request.

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

End User Interaction Application

Database

Figure 7h: Overall Process - Step 7

Data Acquisition Application passes response
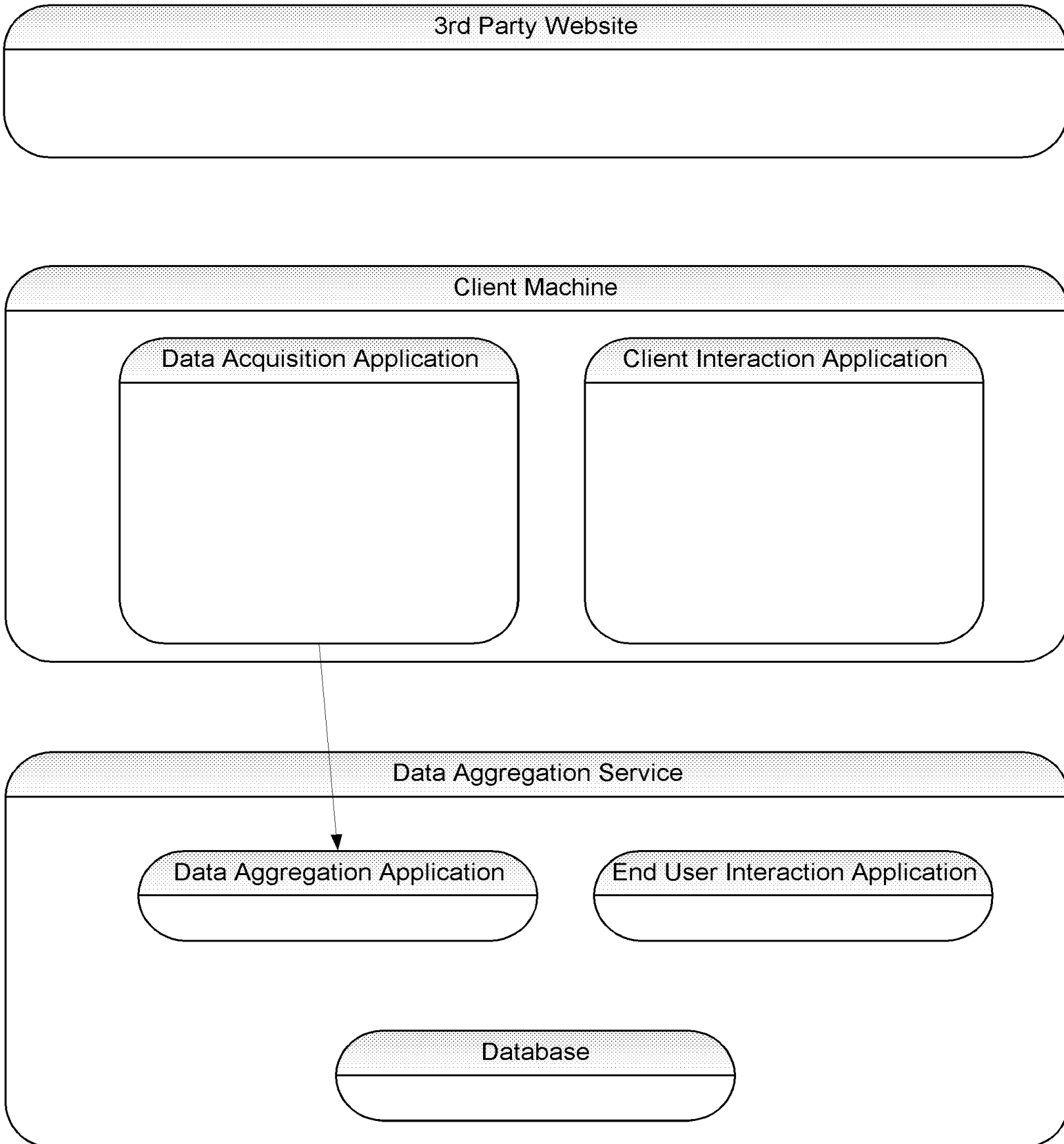(or a transformed, modified version) to the Data
Aggregation Application

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

End User Interaction Application

Database

Figure 7i: Overall Process - Step 8

Data Aggregation Application stores the data in
the Data Aggregation Service database

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

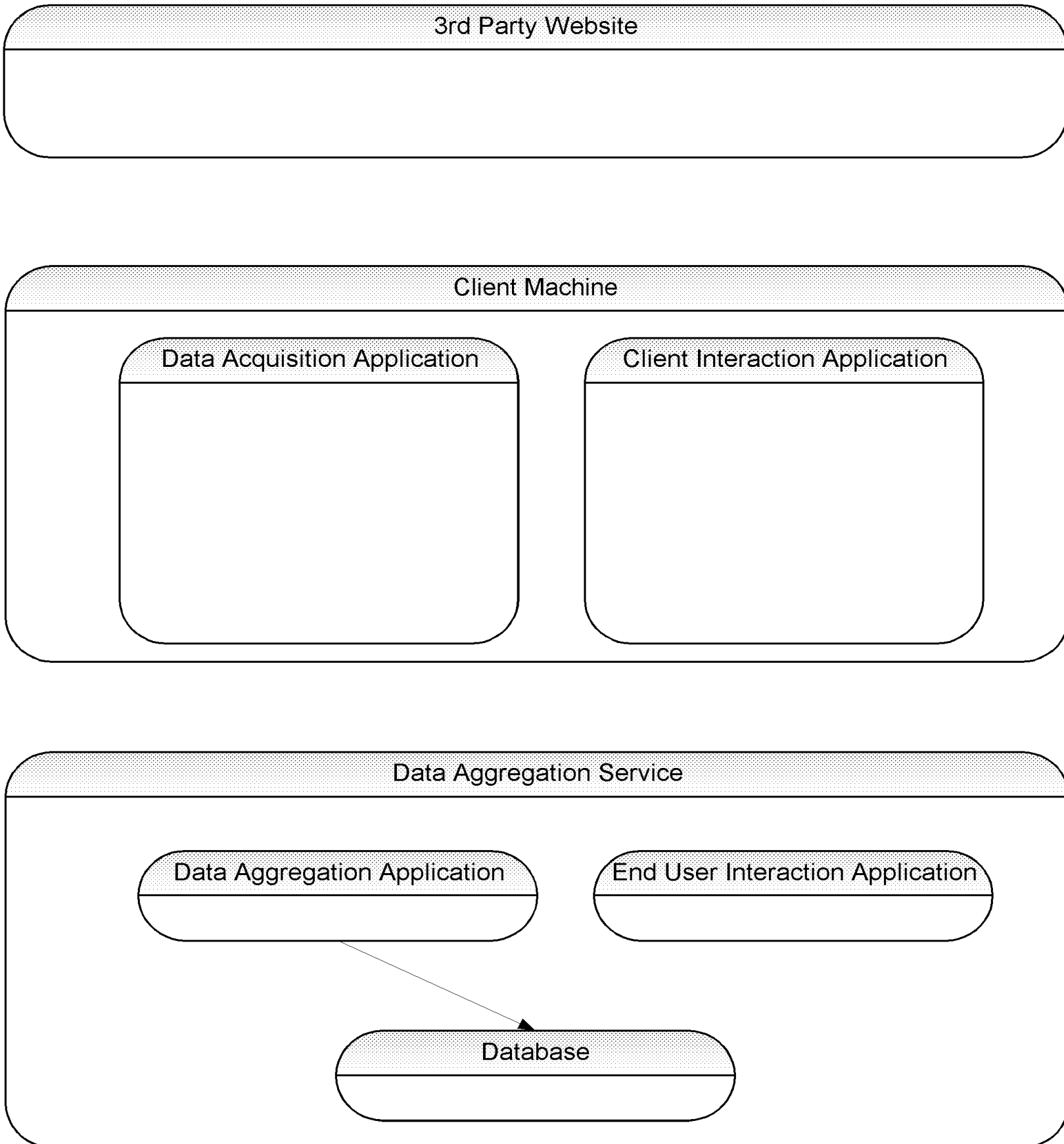Data Aggregation Application

End User Interaction Application

Database

Figure 7j: Overall Process - Step 9

Repeat Steps 3 - 8 as many times as
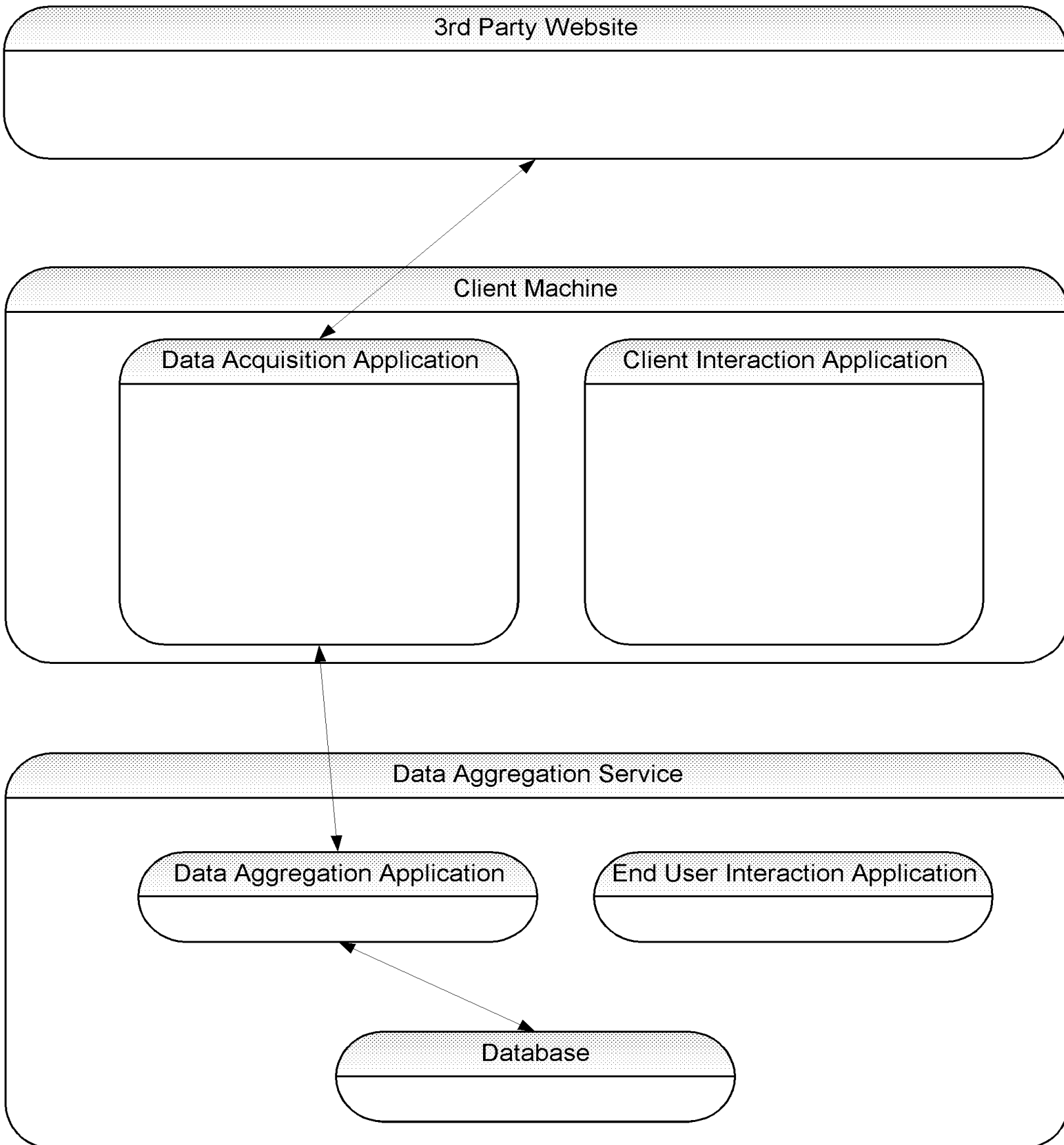necessary to store all data relevant to
end user's profile(s)

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

End User Interaction Application

Database

Figure 7k: Overall Process - Step 10

Client Interaction Application sends request for
information to End User Interaction Application
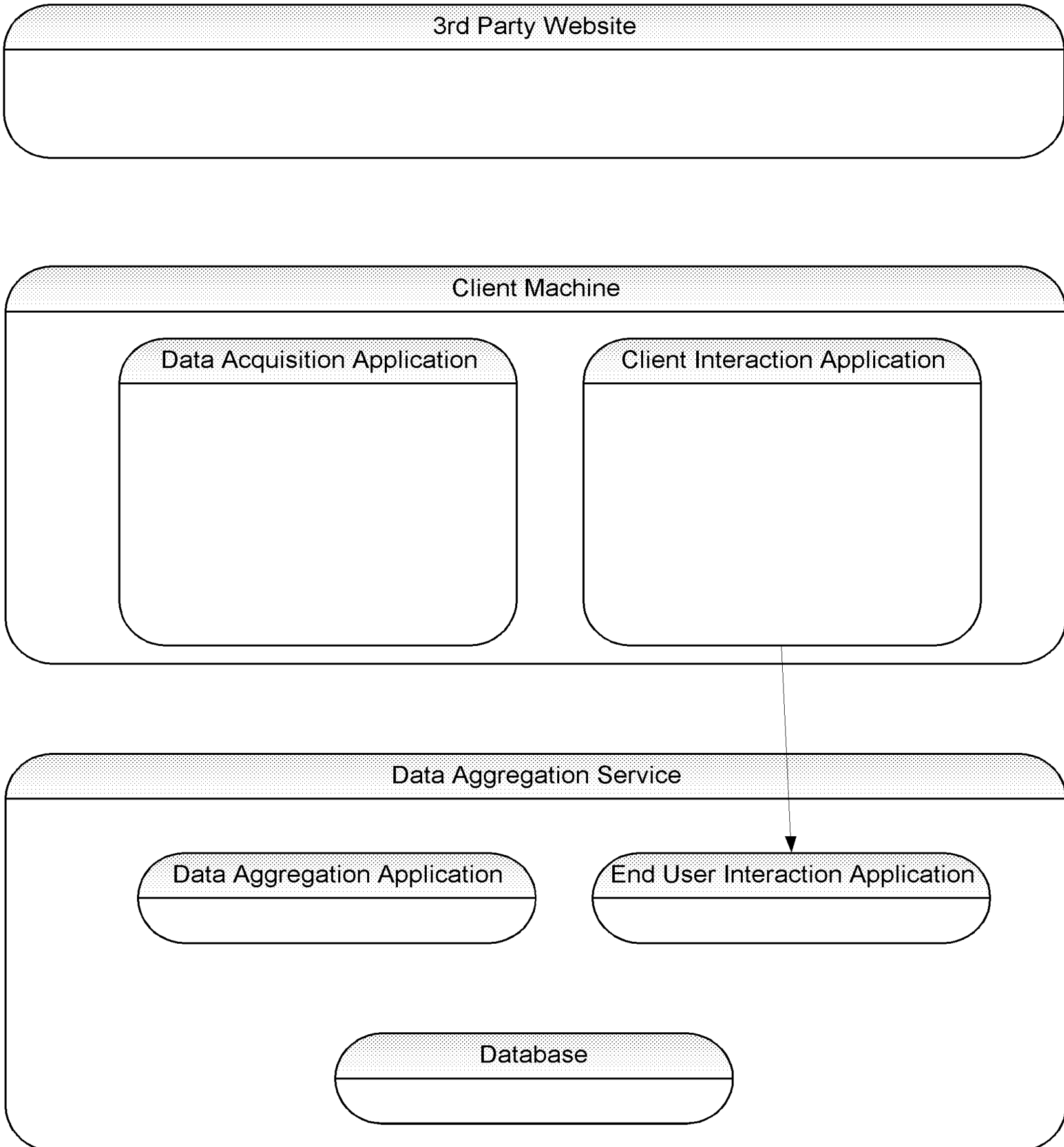on the Data Aggregation Service

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

End User Interaction Application

Database

Figure 7I: Overall Process - Step 11

End User Interaction Application on the Data
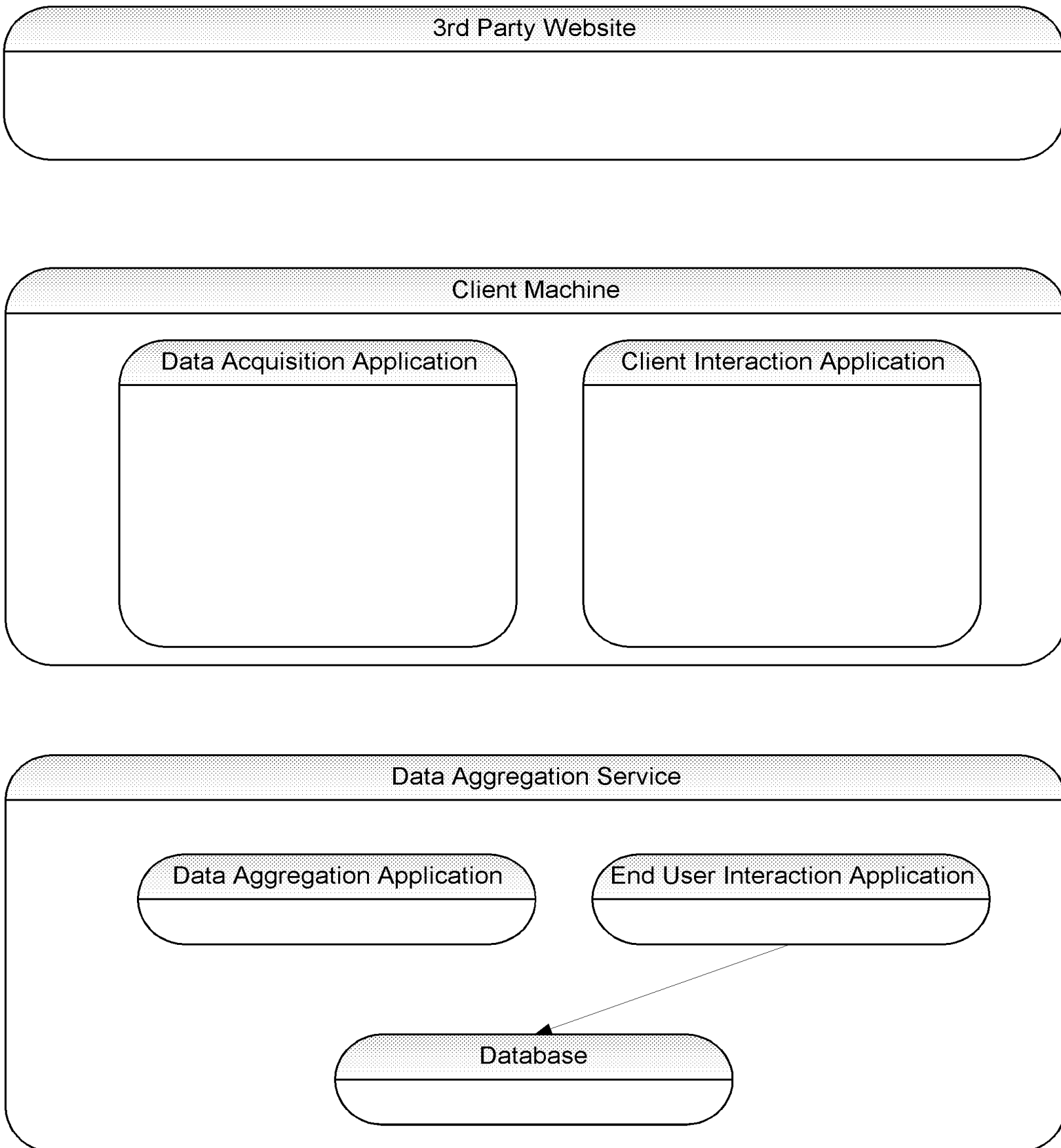Aggregation Service sends request for
information to Database

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

End User Interaction Application

Database

Figure 7m: Overall Process - Step 12

Data Aggregation Service Database replies
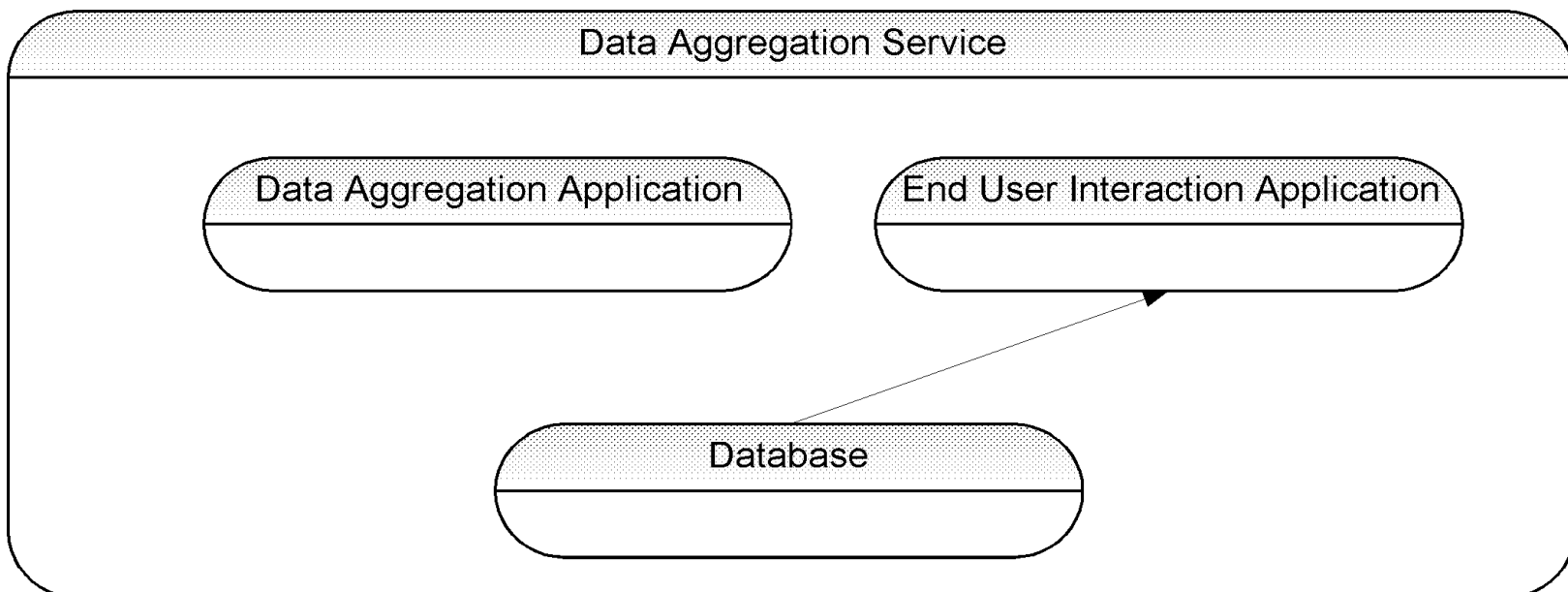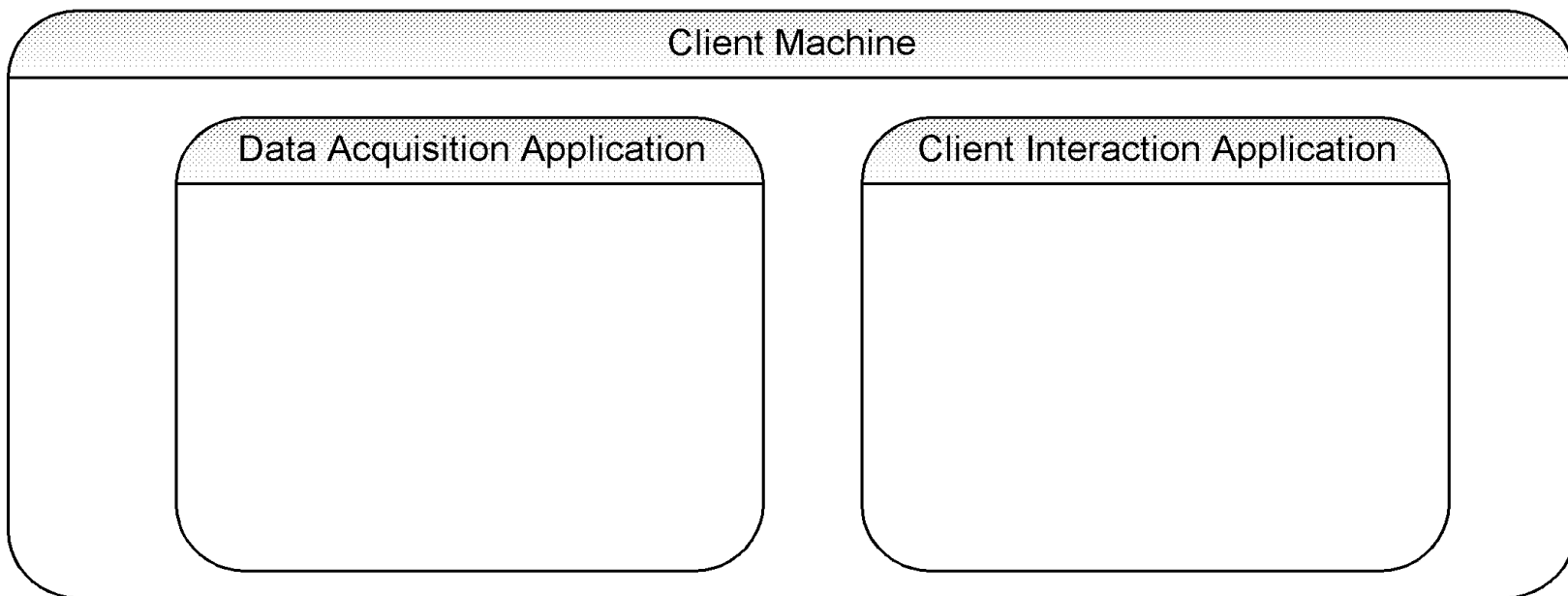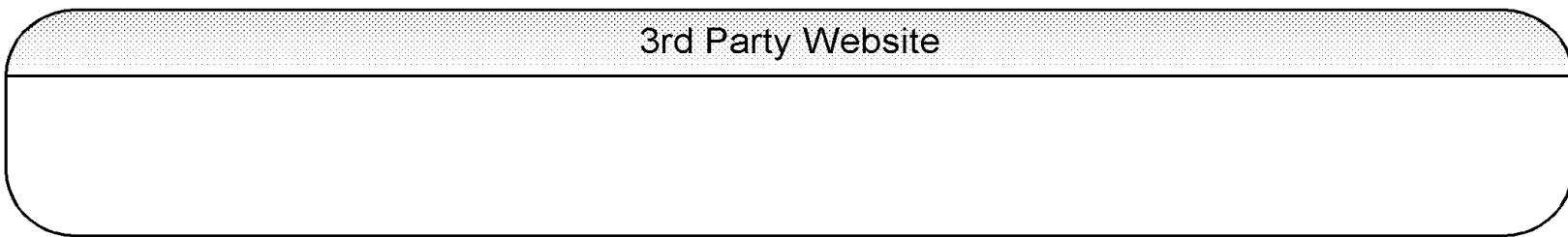to End User Interaction Application
with requested data

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

End User Interaction Application

Database

Figure 7n: Overall Process - Step 13

End User Interaction Application
replies to Client Interaction Application
with requested data

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

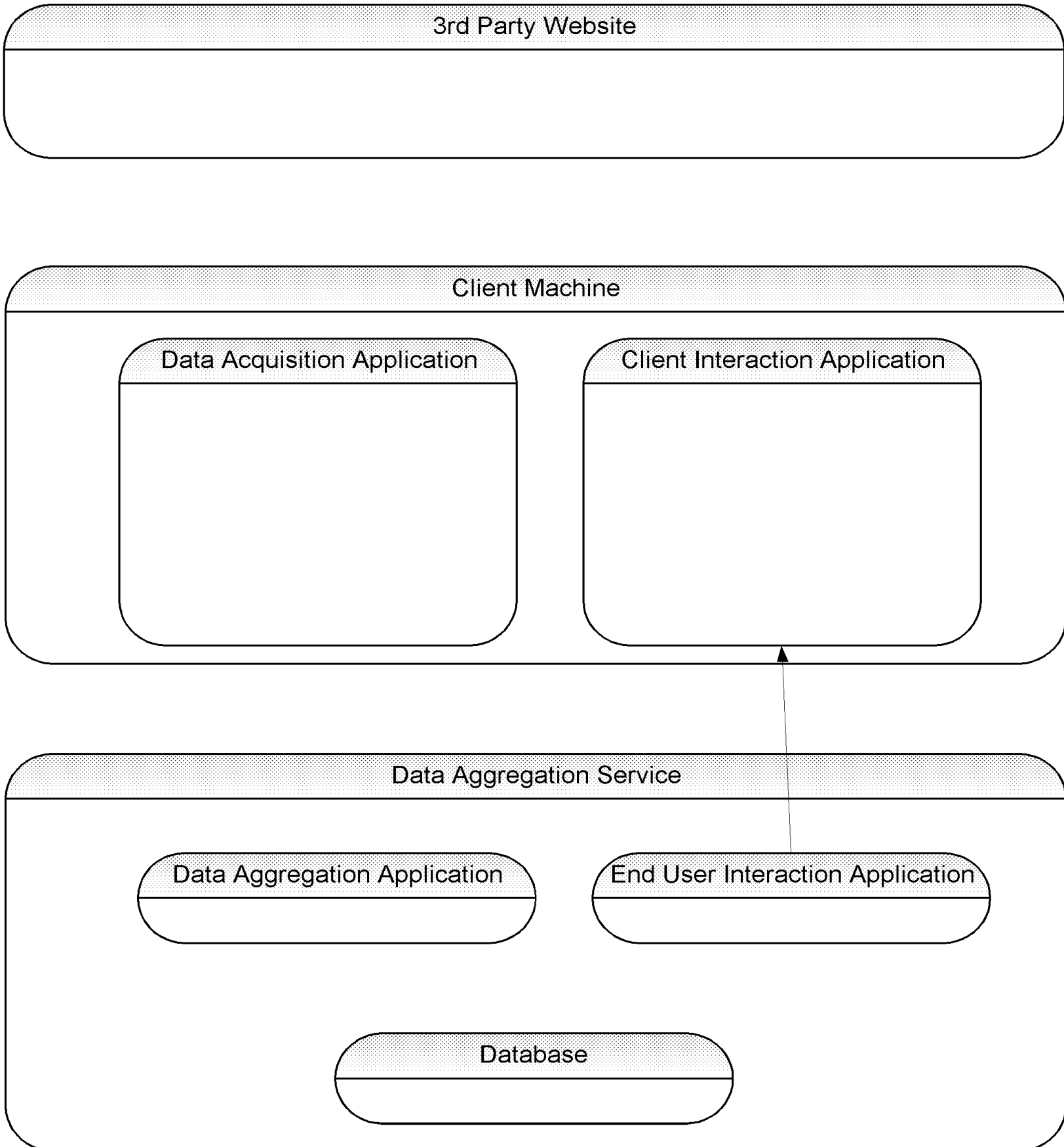End User Interaction Application

Database

Figure 7o: Overall Process - Step 14

Repeat Steps 10 - 13 every time the Client
Interaction Application requests information
from the Data Aggregation Server

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

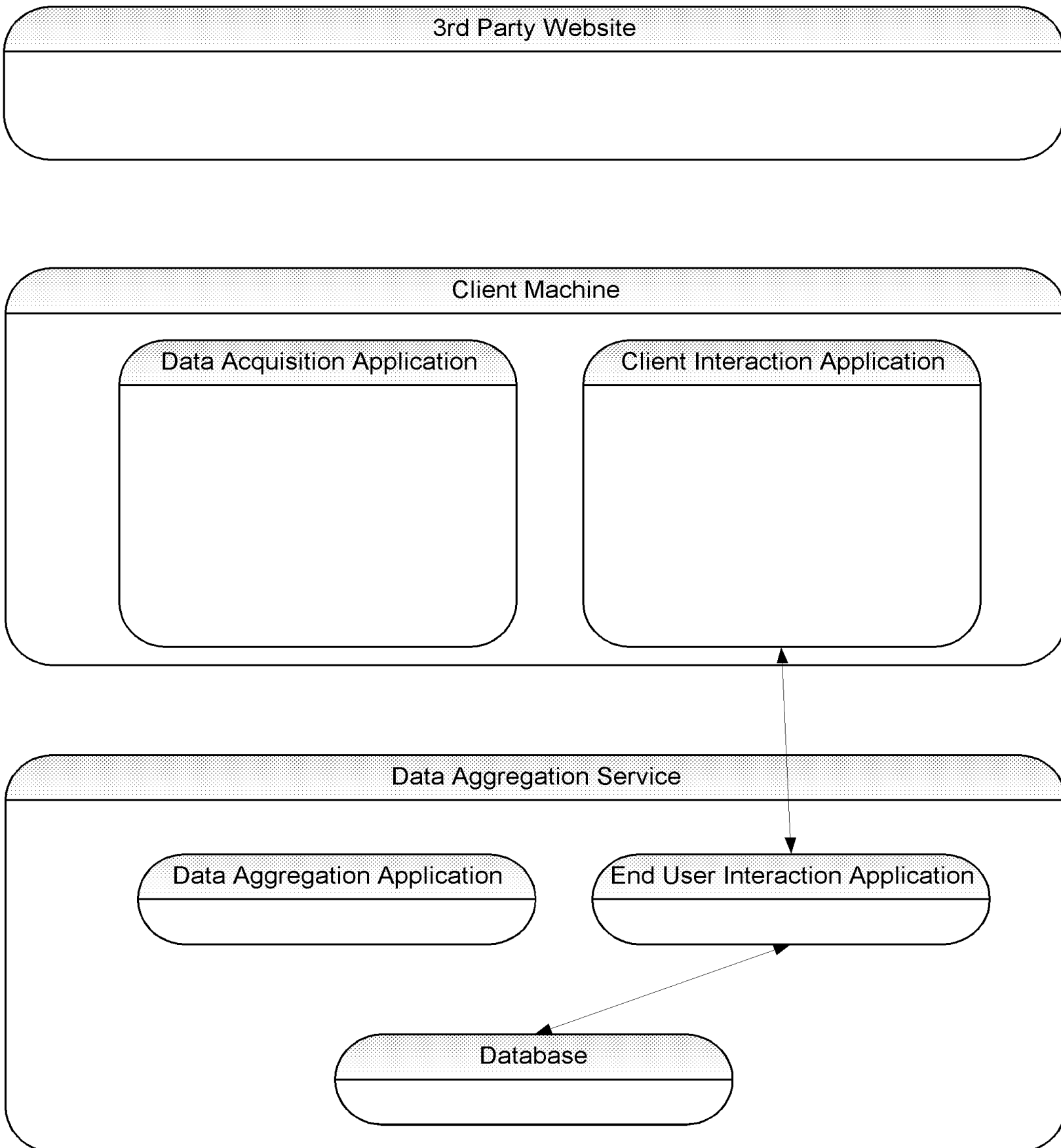End User Interaction Application

Database

Figure 8a: Client Browsing (Step 1: User Visits Website)

An end user traverses a computer-based network (e.g., "surfs" the Internet using a Web browser) and visits a 3rd Party Website that serves to the Client Machine data of interest to the Data Aggregation Service

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

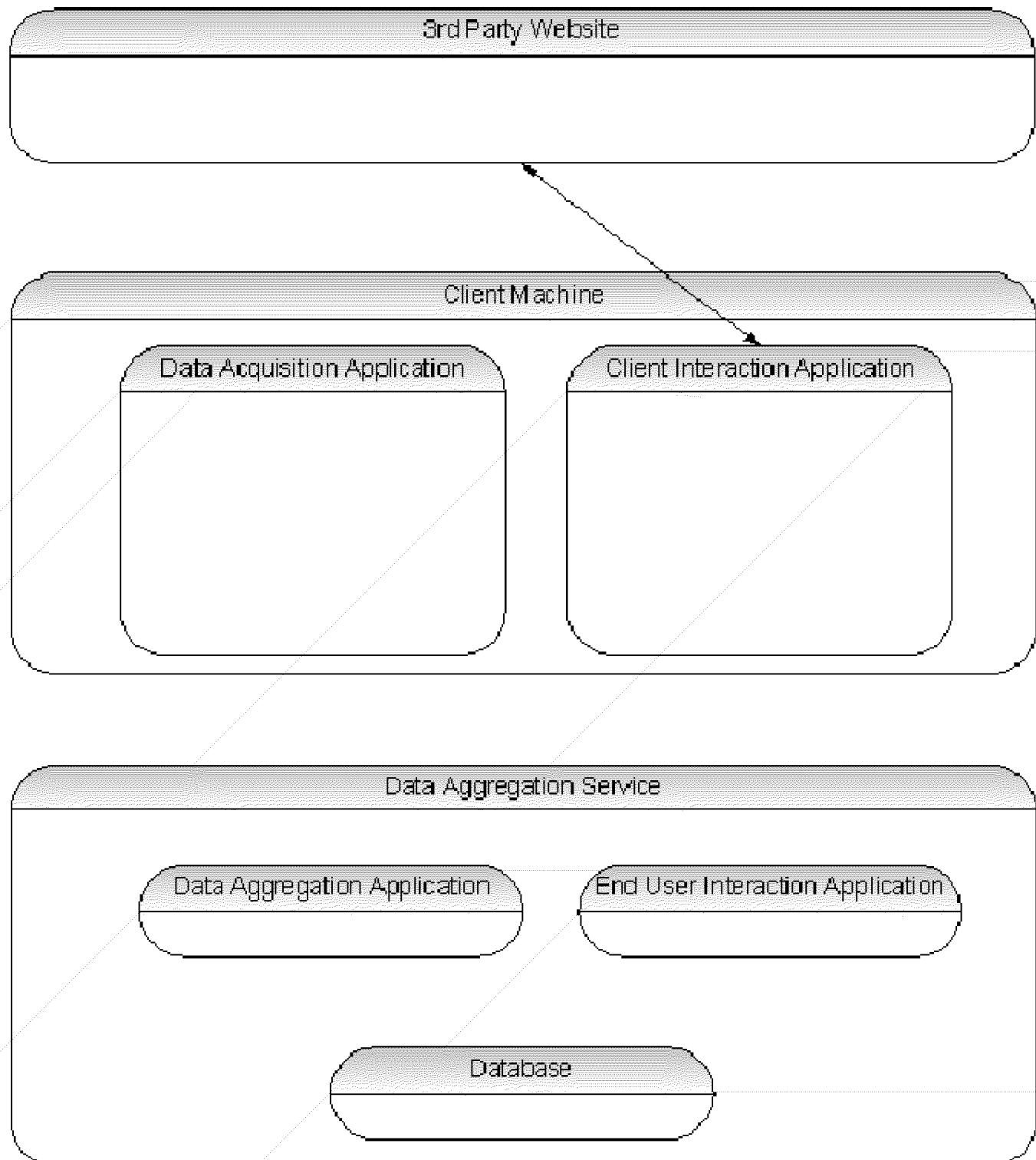End User Interaction Application

Database

Figure 8b: Client Browsing (Step 2: Listening Process)

While the Data Acquisition Application is (with the user's knowledge and permission) constantly monitoring and interpreting the content of the user's browsing session, it detects that the recently-downloaded 3rd Party Website data is of interest to the Data Aggregation Service and it extracts desired data.

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

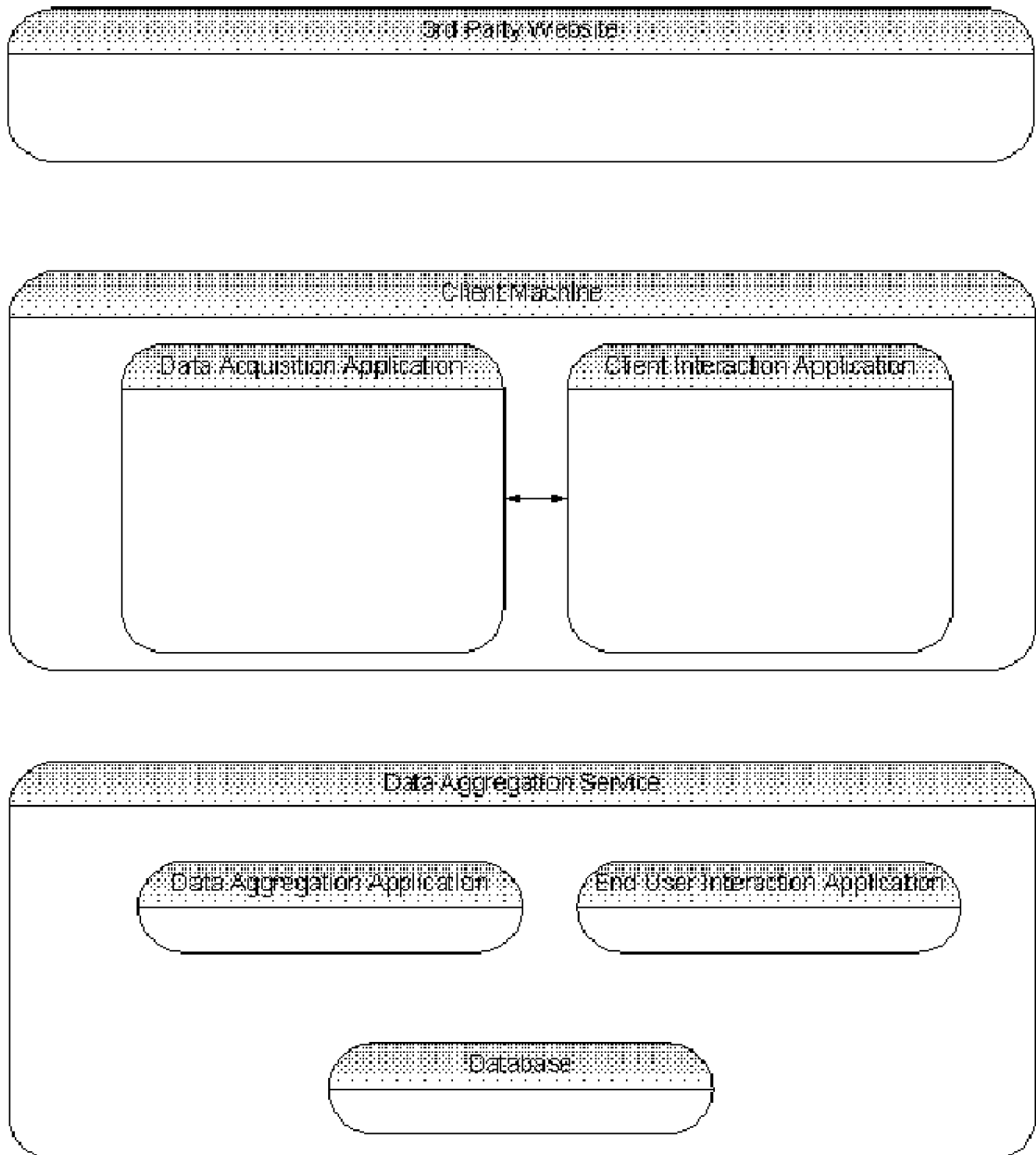End User Interaction Application

Database

Figure 8c: Client Browsing (Step 3: Upload Data to Server)

After detecting data of interest and possibly reformatting it, the Data Acquisition Application sends this data to the Data Aggregation Service

3rd Party Website

Client Machine

Data Acquisition Application

Client Interaction Application

Data Aggregation Service

Data Aggregation Application

End User Interaction Application

Database